EFFECTIVENESS OF BEHAVIOURAL MODIFICATION THERAPY ON NOCTURNAL ENURESIS AMONG RURAL CHILDREN IN MADURAI

A DISSERTATION SUBMITTED TO THE TAMILNADU DR M.G.R MEDICAL UNIVERSITY, CHENNAI, IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF MASTER OF SCIENCE IN NURSING

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CERTIFICATE

This is the bonafide work of **Ms. Poornima.P.** M.Sc., Nursing II year student from Sacred Heart Nursing College, Ultra Trust, Madurai, submitted in partial fulfilment of the **Degree of Master of Science in Nursing** under The Tamilnadu Dr.M.G.R. Medical University, Chennai.

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ABSTRACT

A true experimental study to assess the efficacy of behavior modification therapy on Nocturnal Enuresis among children residing in selected rural areas in Madurai was carried out to identify the prevalence of Nocturnal Enuresis among children and to evaluate the effectiveness of behavior modification therapy. **Sampling Technique:** simple random sampling technique. **Sample:** 100 nocturnal enuretic children in the age of 5 – 10 years from two rural areas of Madurai. **Tool**: Nocturnal Enuretic rating scale was used to assess the Nocturnal enuresis level. **Intervention:** Behavior modification therapy was implemented for experimental group including Lifting, Waking, Stop – start training, Good bladder health recommendation, Treatment of nocturnal polyuria, Retention control training and reinforcement therapy which was a 15 minutes session a day over 4 weeks. **Statistical analysis:** Obtained data analyzed in terms of both descriptive and inferential statistics. **Results:** Findings showed that, the overall prevalence of Nocturnal enuresis was 47.75%. In pre test; 36 children (72%) were in moderate level and 1 child (2%) was in severe level of Nocturnal enuresis. Whereas, in post test with none of them were in moderate and severe level of Nocturnal enuresis. All (100%) were in mild level of Nocturnal enuresis. But in control group, Nocturnal enuresis level remain unchanged. The mean post test nocturnal enuretic score 1.14 of experimental group was lower than the mean post test nocturnal enuretic score 5.9 of control group with a 't' value 18.6. There was no association between the nocturnal enuretic score and demographic variables. **Conclusions:** It can be concluded that behavior modification therapy also can used to reduce the Nocturnal enuresis level in children.

CHAPTER-I

INTRODUCTION

BACKGROUND OF THE STUDY

Children learn what they live.

If a child lives with criticism, he learns to condemn.

If he lives with hostility, he learns to fight.

If he lives with ridicule, he learns to be shy.

If he lives with shame, he learns to be guilty.

If he lives with tolerance, he learns confidence.

If he lives with praise, he learns to appreciate.

If he lives with fairness, he learns about justice

Dorothy Nolte 1924 - 2005

A child is an important asset not only for its family, but also for the whole nation. The children constitute the most vulnerable and an important segment of the population. Ultimately the nation's development is dependent upon the improvement of the human resources. So the future of our nation depends on the way in which we nurture our children.

Health of the children has been considered as vital importance to all societies because children are the basic resource for the future of human kind. Children are the major consumers of health care. In India, about 35 percent of the total population are children below 15 years of age. They are not only large in number but vulnerable to various health problems and considered as special risk groups. Majority of the childhood sickness and death are preventable by simple low cost measures. "What is done to children, they will do to the society. Children are the wealth of tomorrow". (**Meninger, 2007).**

Young people can have mental, emotional & Behavioural problems that are real, painful & costly. These problems often called as disorders are sources of stress for children & their families, schools & communities. Recent evidence indicates that emotional & behavioural problems frequently lead to poor school performance & drop out of school. Several risk factors including child's familial & Environmental risk factors play an important role in the genesis of emotional and behavioural problems in school children**. (Cumins, 2003).**

Childhood is an important period of life, for most of the behaviours and healthy practices develop during this period. Learning takes place through various institutions such as family, school, community. Family is the place for teaching curricular and cultivating healthy behavior and practicing habits among children. Behavioral problem influences the general health of an individual. Prevalence of emotional & behavioral problems among school children in India has been evaluated as follows. **(metilda, 2000).**

Emotional & Behavioral problems	**School children**
Anxiety	13.5%
Enuresis	11.9%
Depression	8.6%
Somatic disorders	7%
Autistic disorders	6.9%
Hyperactivity	6.1%
Aggression	4%
Somnambulism	3.6%

Parents are undoubtedly not the only people who significantly influence children's misbehaviour. Siblings, day-care providers, teachers, babysitters, grandparents & peers are also the participants. Interest in parents discipline practices has a long history, nearly 60 years ago. Young children's Aggressive and oppositional behaviour disorders are quite stable, if left untreated, these disorders predict later delinquency, drug and alcohol abuse, family levels, unemployment and psychiatric disturbance. Understanding what constitutes effective parental discipline practice, particularly for young children, should include both the prevention and the treatment of children's behaviour problems. (**Sohan. J, 2009).**

Children's normal Behaviours depend on various natural and environmental circumstances in which a child grows and observes the way for his best possible conduct within his reach and interact amongst those who respond his gestures and body talks. Diffidently parents are the first to whom a child makes and develops his concerns regarding his needs and wants. (**Amanda, 2006).**

Wetting bed frustrates a lot of parents, and kids consider this problem as one terribly humiliating experience. This is something worse than the monsters under their beds and closets. The medical term for bedwetting is Nocturnal Enuresis. In some cases, kids experience this condition even until their teens which prevents them from enjoying sleepovers and slumber parties. For a child with involuntary bedwetting, the mere thought of sleeping over at someone's house is fearful and anxiety-filled that his or her secret will be discovered**. (Goodnites, n.d).**

Childhood nocturnal enuresis has traditionally been regarded as a multifaceted problem. Enuresis frequently resolves spontaneously, frequent bed wetting is often upsetting to both parents and children. Physicians should realize that nocturnal

enuresis could be an important problem not only for the child but also for the entire family. Many mothers of enuretic children feel that doctors do not pay enough attention to this problem. Nocturnal urinary continence is dependent on 3 factors:

1. Nocturnal urine output,
2. Nocturnal bladder function, and
3. Sleep and arousal mechanisms.

Disturbance in nocturnal urine production, bladder functions and arousal mechanism have all been firmly implicated as pathogenetic factors in nocturnal enuresis. Bed wetting may cause social and emotional problems for a child due to negative reactions from parents, siblings, and peers. The child's social life may be restricted. A child may be reluctant to sleep overnight anywhere other than his/her own familiar surroundings. Other symptoms may develop depending upon how family members react to the bed wetting. "If parent's chose to use punishment, the problem of bed-wetting increases**" (Goin, 1999).**

Bedwetting or nocturnal enuresis is a common phenomenon in children between the age group of 1-8 years. This involuntary passing of urine while in sleep is a problem found in 20% of children. However, with a good knowledge of the causes and cures available for this problem, you may be able to steer your child away from this problem. Bedwetting, which happens with many children, is a problem quite embarrassing for the child as well as the parents. Struggling to cure this problem in their child, parents often get desperate and vent their fury on the child. Little do they know that it is not the child's fault at all

Bedwetting (also called night time wetting or nocturnal enuresis) is a common childhood problem. Children learn to control daytime urination as they become aware of their bladder filling. Once this occurs, the child then learns to consciously control and coordinate his or her bladder. This generally occurs by four years of age. Night time bladder control usually takes longer and is not expected until a child is between five and seven years old**. (Drutz, et al., 2011).**

Nocturnal enuresis affects approximately 5 to 7 million children in the United States, making it the most common pediatric urologic complaint encountered by primary care physicians. Despite its prevalence, nocturnal enuresis remains incompletely understood, which can frustrate patients, family members, and physicians. Appropriate intervention is justified for the affected child because of the potential consequences of family stress, social withdrawal, and poor self-esteem**. (Lawless, et al., 2001).**

Most children are continence by the age of 4 or 5 years. Nocturnal enuresis is common and usually does not require treatment in children of preschool age who have achieved continence during the day. Children with this condition often have low self-esteem and their interpersonal relationships and quality of life and school–performance are affected. The international children continence society has defined nocturnal enuresis as, the voluntary loss of urine that occurs only at night. It is normal voiding that happens at an inappropriate and socially unacceptable time and place**. (Doleys, 2000).**

A study to determine the prevalence & correlates of nocturnal enuresis in the United Arab Emirates was conducted. This study revealed that the prevalence of primary Nocturnal Enuresis in Australia has been estimated as 18.9% in children 5 to 12 years of age, with up to 19% of boys and 16% of girls aged 5 years wetting the bed at least once per month. Up to the age of 13 years bedwetting is more common in boys but more common in girls after this age**. (Eapen & Mabrouk, 2003).**

According to, BCBSM/**BCN Medical Policies, (2010)** Enuresis is defined as the repeated, involuntary voiding in bed or clothing after a person has reached an age at which continence is expected. Enuresis becomes primary when the child has never established a six-month period of urinary continence or secondary if the child

becomes incontinent after a six-month period of continence. Current theories suggest a variety of causes for nocturnal enuresis, including but not limited to, genetic predisposition, bladder capacity, insufficient arginine vasopressin, constipation, psychological factors and sleep disorders.

A study to assess the Prevalence of nocturnal enuresis, risk factors, associated familial factors and urinary pathology among school children in Iran, describes that, nocturnal enuresis is best regarded as a group of conditions with different aetiologies. The current belief is that the condition is multifactorial, with a complex interaction of genetic and environmental factors. Numerous etiologic factors have been proposed, Genetic predisposition is the most frequently supported etiologic variable. Many studies found that when one or both parents were Enuretic as children, their offspring had a higher risk of having nocturnal enuresis. Familial factors that have been found to have no relationship to the achievement of continence include social background, stressful life events and the number of changes in family residences. (**Butler, 2008).**

A study to assess the Enuretic behavior of the children in Kerala shows that, 18.6% has had an episode of enuresis in the past year and 4.3% in the past week. Enuresis was associated with parent's education, physical and psychiatric symptoms in the child, poor academic achievement and lax parental attitudes to toilet training. (**Hackett, 2008).**

A study to assess the effectiveness of behavioral treatment of nocturnal enuresis in Brazil, reports that the Children tend to outgrow bed wetting with a spontaneous remission rate of about 14% annually among bed wetter with 3% remaining Enuretic as adults. Bedwetting is more common in boys. The worldwide prevalence of nocturnal enuresis has been difficult to estimate because of variations in

definition and in social standards. It is estimated that 15-20% of children have some degree of bed wetting below 5 years of age , with a spontaneous resolution rate 15% per year. (**Boggs & Giffkens, 2000).**

A reward or positive reinforcement refers to positive ways, adults can respond when children behave in desirable ways, positively rewarded behaviour is usually repeated. (**Archar, 1999).**

SIGNIFICNCE AND NEED FOR STUDY

The word enuresis is derived from a Greek word that means "to make water." In North America, the term is used to refer to wetting by night or day**. (Robson, 2010).**

Nocturnal enuresis is involuntary urination during sleep that occurs more often than once a month in girls over five and in boys over six years of age. It is more common in boys than in girls. It is estimated that 15% to 20% of children wet the bed frequently enough to be considered Enuretic. (**Husain & Cantwell, 2000).**

“Secondary nocturnal enuresis (SNE) is defined by the International Children’s Continence Society as bedwetting that develops after a period of at least 6 months of consistent dryness”. According to literature from Robson, “secondary nocturnal enuresis accounts for about one quarter of patients with bed wetting.” It is estimated that “approximately 80% of clients diagnosed with enuresis have primary enuresis”. (**Robson, 2000).**

Yousef (2011) studied the nocturnal incontinence in Aden school going children to describe severity and relation between nocturnal enuresis with family and personal characteristics. It was a cross-sectional study conducted on school children in

Aden, Yemen, in the period November 2007- April 2009. Primary nocturnal enuresis affected 76.1%, children were bedwetting every night. Positive family history of nocturnal enuresis, deeper sleep, tea drinking, daytime enuresis, stressful events in the previous 6 months, being non-working father or with less education showed significant association with the occurrence of enuresis in the students. It concluded that the prevalence of nocturnal enuresis in Aden public school children and its associated factors are comparable. Health education will encourage the parents to be aware, cope with this problem and seek appropriate medical advice.

Nocturnal enuresis is termed as "Shayya Mootra" in Ayurveda. Most Ayurvedic physicians treat this condition according to the associated conditions or causes. Nocturnal Enuresis is defined as bed-wetting which occurs in children aged 3years or more, with at least 1-2 episodes per week over at least a three month period. Nocturnal enuresis may be primary or secondary. Most children with bed-wetting who are 7 years or younger, usually outgrow this condition and hence, do not require any treatment, they need only behavioural therapy**. (Esin, 2008).**

Children who are criticized, humiliated, or punished for their bed-wetting may develop a deep sense of shame, which can create a negative self-image. Because behaviour is a reflection of self-image and self-esteem, a child with negative self-esteem may begin to display additional behavioural problems. (**Sanborn .K, 2002).**

A study conducted in UK to identify the relationship between the self-esteem and the self-image of children with nocturnal enuresis and to examine these in relation to various aspects of clinical and demographic variables. Previous studies investigating the self-esteem of bedwetting children have had mixed findings. Some

studies shows that children with nocturnal enuresis have a lower self-esteem than their non-bedwetting peers. **(Collier et al., 2001).**

A number of things can cause bed-wetting. Some of the more common causes of bed-wetting include the following:

- Genetic factors (it tends to run in families)
- Difficulties waking up from sleep
- Stress
- Slower than normal development of the central nervous system (which reduces the child's ability to stop the bladder from emptying at night)
- Hormonal factors (not enough antidiuretic hormone is produced, which is the hormone that slows urine production at night)
- Abnormalities in the urethral valves in boys or in the ureter in girls or boys
- Abnormalities in the spinal cord
- Urinary tract infections
- A small bladder **(Cendrom, 1999)**

The treatment of Nocturnal enuresis with simple behavioural and physical interventions (e.g. star charts and rewards), alarms, complex behavioural and educational interventions (e.g. dry bed training, counselling and education), complementary and miscellaneous interventions (e.g. hypnosis, acupuncture), and pharmaceutical interventions, have all met with mixed levels of success**. (Hodgkin son, 2008)**

For children with nocturnal enuresis previous advice can be reinforced. If further help is required the use of star charts and reward programmes can be discussed. Star charts should only be used for a short period and should focus on

achievable goals. The nurse will offer general advice and support to the child and family e.g. diet, fluid intake, hygiene and regular toileting**. (Doncaster, 2008)**

Intensive Behavioural therapy was described as, Lifting, waking, Stop start training, Good bladder health recommendations, Treatment of Nocturnal polyuria, Retention control training, Alarm therapy. (**Lane & Robson, 2008).**

Several procedures may enhance the effectiveness of treatment. Rewards for complying with procedures and for self-monitoring wet and dry nights should be included in the treatment of young children. Incentives for compliance may be more desirable than providing a reward for dry nights, because early successes may be too infrequent for a child to receive positive feedback. Parental support and negative patient perceptions of bed-wetting favour positive outcomes. This involvement may be viewed as undesirable by the child and, in turn, become a motivating factor in staying dry **(Cendron, 1999).**

A cross-sectional study was carried out in Nigeria to determine the prevalence and perception of the condition among children in Igbo-Ora, a rural community in south western Nigeria. Four hundred parents/guardians were interviewed and information obtained on 644 children aged between 6-12 years. Overall enuresis prevalence was 17.6% (19.9% among boys and 14.9% among girls). The reported causes of nocturnal enuresis included urinary tract infection (33.5%), excessive play (27.5%) and deep sleep (25%). A majority (74.5%) of the respondents would use herbs or traditional medicine to treat enuresis, while only 6.8% of the respondents sought orthodox healthcare facilities for its management. Only 18 (25%) of the 71 parents/guardians with Enuretic children had ever consulted a health worker. The misconceptions and inappropriate enuresis management methods among the parents/guardians require health education intervention**. (Osungbade KO, 2001)**

In rural areas, mothers are unaware of the impact of this problems and unable to handle effectively. The above reasons prompted the researcher to undertake the present study.

STATEMENT OF THE PROBLEM

A study to determine the prevalence of nocturnal enuresis and the efficacy of Behaviour modification therapy on Nocturnal Enuresis among children residing in selected rural areas, Madurai.

OBJECTIVES

1. To identify the prevalence of children with nocturnal enuresis.
2. To assess the pre-test and post-test level of nocturnal enuresis among children who had behaviour modification therapy in experimental group.
3. To assess the pre-test and post-test level of nocturnal enuresis among children in control group.
4. To evaluate the effectiveness of behavioural modification therapy on nocturnal enuresis among children.
5. To find out association between the pre-test Nocturnal enuretic score of children in experimental group and their selected demographic variables, clinical profile and contributing factors.

HYPOTHESIS

1. The mean of the post-test nocturnal enuretic score will be significantly lower than the mean of the pre-test nocturnal enuretic score of the experimental group who had behaviour modification therapy.
2. The mean of the post-test nocturnal enuretic score of the experimental group will be significantly lower than the mean post-test nocturnal enuretic score of the control group.
3. There will be a significant association between the pre-test nocturnal enuretic score among children and their selected demographic variables.

4. There will be a significant association between the pre-test nocturnal enuretic score among children and their selected clinical profile
5. There will be a significant association between the pre-test nocturnal enuretic score among children and their selected contributing factors related to nocturnal enuresis.

OPERATIONAL DEFINITIONS

Prevalence

Prevalence refers to all current cases existing at a given point of time or over a period of time in a given population. It refers to the total number of children identified with nocturnal enuresis in the selected villages as per the screening tool.

Efficacy

It means capacity to produce desired effect. In this study it refers to the outcome of behavioural modification therapy in changing the Enuretic behaviour of children as elicited by the difference in the mean of the post test scores obtained using nocturnal enuretic rating scale for nocturnal enuresis.

Nocturnal Enuresis

It is involuntary urination while asleep after the attainment of bladder control which usually occurs at the age of 4 years. In this study children having frequent bed wetting at least 2 times/ month are considered to have nocturnal enuresis.

Children

The children in the age group of 5 to 10 years having nocturnal enuresis in selected rural villages.

Behaviour Modification Therapy

This is the intervention done by the researcher to modify the enuretic pattern using following approaches,

- Lifting and Waking
- Stop-start training
- Good bladder health recommendation
- Treatment of nocturnal polyuria
- Retention control training
- Reinforcement therapy

Rural Areas

This refers to the villages namely Karungalakudi and Pettai which come under Karungalakudi PHC block.

ASSUMPTIONS

- Nocturnal enuresis is a common problem in children
- Parent or guardian will respond to the questionnaire in a reliable manner.
- Children will co-operate with the intervention.

DELIMITATIONS

The study limited to

- Age group 5 to 10 years
- Children residing in selected village during the Data collection.
- Children without physical and mental disorder.

Projected outcomes:

The study is conducted to assess the effectiveness of behaviour modification therapy on nocturnal enuresis among children of 5 – 10 years of age, since it has no allopathic side effects. Findings of the study would help in planning behavior modification therapy in the area of nocturnal enuresis prevalence but also implement this as a health promotion measure for at risk and risk groups, there by preventing behavioural problems.

CONCEPTUAL FRAMEWORK

The study was based upon the J.W Kenny's open system model. This serves as modes for viewing people as interacting with the environment. The system theory is concerned with changes due to interaction between the person and the environment changes continually. The system theory provides a way to understand the many influences in the whole person and the possible impact of change of any part of the system.

The main concepts of all open system model are input, throughput and output. The general system theory provides a useful frame work with which to approach the concept of behavioural modification therapy for treating nocturnal enuretic pattern among children between 5-10 years of age.

Input

Input is any form of energy, information that enters to in the system through its boundaries. Put through is the process of selection. The system refers to the nocturnal enuresis status among children between 5-10 years. The input is behaviour modification therapy for children between 5 -10 years of age.

Throughput

It is a process that occurs between the input and output. It enables the input to be transformed into output in such way it can be readily used by the system in the study. The throughput will be the process of transmission of practice to the children with nocturnal enuresis pattern by the use of the behaviour modification therapy.

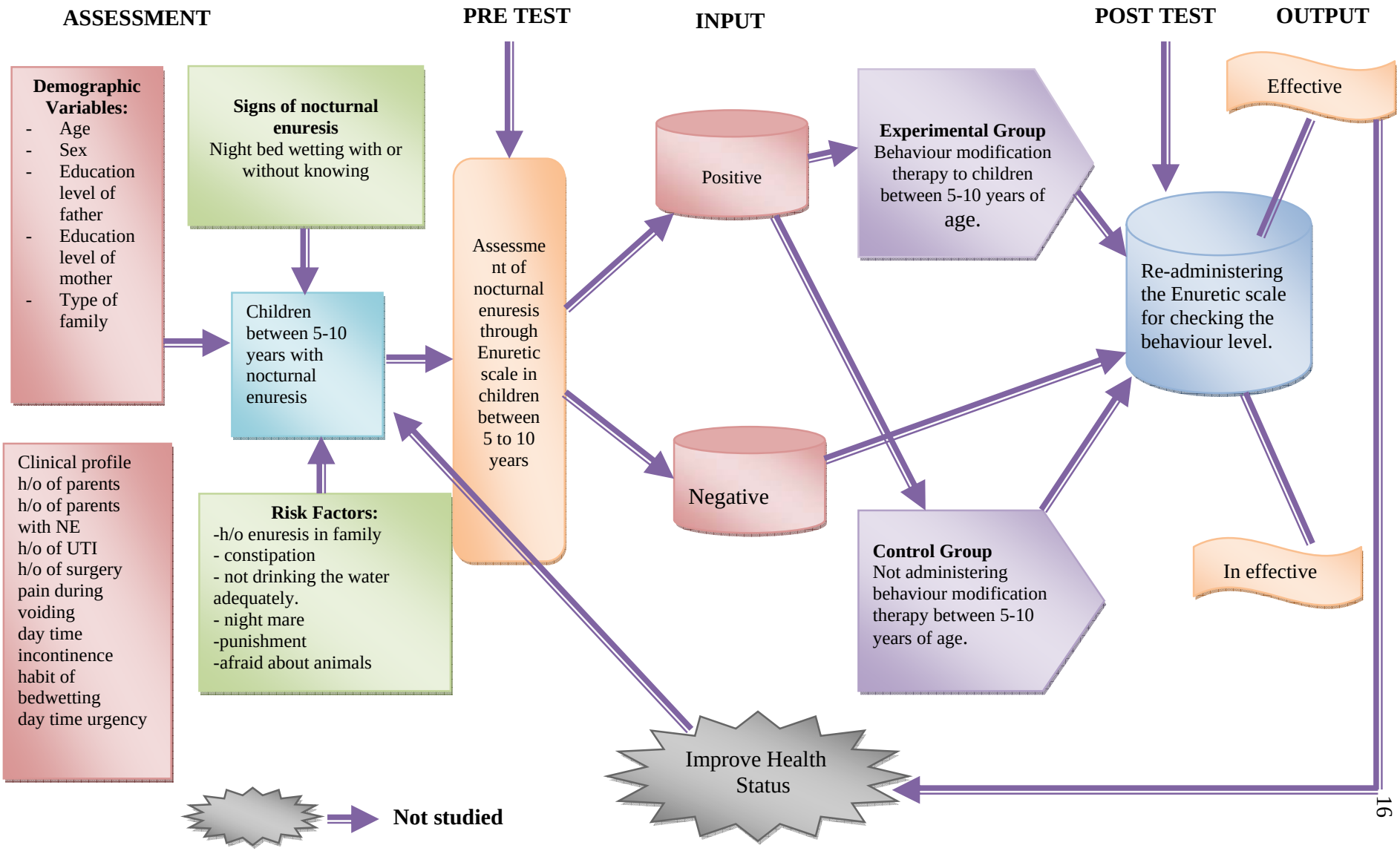
Output

After processing the input and the system output of the environment is obtained in an altered state. It is any energy or information that is transferred to the environment. In this study, the output was an improvement in the practice of behaviour modification therapy to reduce nocturnal Enuretic pattern which will be measured on post test.

Feed Back

Refers to improvement as a result of intervention such as behaviour modification therapy which is analysed in post test.

Figure 1: Conceptual Frame work Based on J.W. Kenny's Open system Model



CHAPTER – II

REVIEW OF LITERATURE

Recent as well as past studies relating to the prevalence of nocturnal enuresis are reviewed in this chapter under the following major heads.

1. Concepts related to nocturnal enuresis
2. Studies related to the prevalence of nocturnal enuresis in children.
3. Studies related to treatment of nocturnal enuresis.
4. Studies related to the effectiveness of behaviour modification therapy in controlling the nocturnal enuresis in children.

Section: I - Concepts related to nocturnal enuresis:

Enuresis is involuntary urination during sleep that occurs more often than once a month in girls over five and in boys over six years of age. It is more common in boys than in girls. It is estimated that 15% to 20% of children wet the bed frequently enough to be considered Enuretic. (Husain, Cantwell, Walsh & Menvielle, 2000).

“Secondary nocturnal enuresis (SNE) is defined by the International Children’s Continence Society as bedwetting that develops after a period of at least 6 months of consistent dryness”. According to Robson. “secondary nocturnal enuresis accounts for about one quarter of patients with bed wetting.” It is estimated that “approximately 80% of clients diagnosed with enuresis have primary enuresis” (Doleys et al., 2000).

Nocturnal enuresis is a common problem that can be troubling for children and their families. Recent studies indicates the possibility of two subtypes of patients with nocturnal enuresis: those with a functional bladder disorder and those with a maturational delay in nocturnal arginine vasopressin secretion. The assessment includes thorough history, a complete physical examination, and urinalysis. Treatment options include nonpharmacologic and pharmacologic measures. Continence training should be incorporated into the treatment regimen. (Thiedke, 2003).

a. Signs and Symptoms:

According to the American Psychiatric Association's Diagnostic and Statistical Manual of Mental Disorders, clinical enuresis is defined as the repeated voiding of urine into bed clothes - whether involuntary or intentional. The behaviour is clinically significant as manifested by either a frequency of twice a week for at least three consecutive months or the presence of clinically significant distress or impairment in social, academic (occupational), or other important areas of functioning. Chronological age is at least five years (or equivalent developmental level). The behaviour is not due exclusively to the direct physiological effect of a substance (e.g. a diuretic) or a general medical condition (e.g. diabetes, spina bifida, a seizure disorder) (Goin, 1998).

b. Causes

In most cases the cause of bed-wetting is unknown. The following are the most common causes or popular theories. As stated earlier, an examination by a medical doctor should always be the first step in ruling out any underlying illnesses or conditions such as diabetes, urinary-tract infection, abnormalities in the urethral valve in boys or the ureter in girls or boys, and abnormalities in the spinal cord, genetic

factors, biological factors, psychological factors, sleep disorders, improper toilet training, constipation, increased fluid intake at night. (Cendron, 1999).

1. Genetic Factors

A family history of nocturnal enuresis is found in most children with the condition. “The incidence of primary nocturnal enuresis is 77% among children who have both a mother and a father with a history of primary nocturnal enuresis. This rate decreases to 44% in children who have just one parent with a history of primary nocturnal enuresis and to 15% in children who have no parental history of primary nocturnal enuresis” (Gimpel & Warzak, 1998).

When both parents were enuretic as children, their offspring had a 77 percent risk of having nocturnal enuresis. The risk declined to 43 percent when one parent was enuretic as a child, and to 15 percent when neither parent was enuretic. Another investigation found a positive family history in 65 to 85 percent of children with nocturnal enuresis. If the father was enuretic as a child, the relative risk for the child was 7.1, if the mother was enuretic, the relative risk was 5.2. Hence, certain chromosomal loci (5, 13, 12, and 22) have been implicated in nocturnal enuresis. . (Thiedke, 2003).

Twin studies lend support to the genetic-component theory. “Monozygotic (identical) twins consistently show much higher concordance for nocturnal enuresis than dizygotic (fraternal) twins”. If a family history of nocturnal enuresis exists, it should be reported to the family physician. One should not ignore that maturational and developmental factors may also play a factor in nocturnal enuresis. (Abe, Oda & Hatta, 1998).

2. Biological Factors

Some children with enuresis are in a stage where they produce too little of this hormone. “Abnormal secretion of anti-diuretic hormone at night may be a significant factor in the etiology of nocturnal enuresis in some children, although studies of gene markers do not correlate with abnormalities of anti-diuretic hormone function” (Eiberg, Berendt, & Mohr, 1999).

Causes of NE may be a small bladder capacity, excessive output of urine during sleep due to inadequate anti-diuretic hormone production, anxiety events experienced by the child, genetic, upper airway obstruction such as enlarged tonsils or adenoid and less frequently structural problems in urinary tract or nervous system. Most studies have consistently found that the risk factors for enuresis are male gender, low age and family history of enuresis, divorced parents and deep sleep. (Basaleem, 2011).

“Parents report that children who wet the bed usually do so early in the night”. The sleep patterns of Enuretic patients have been studied extensively, but the resulting theories are very inconclusive. With all of the studies that have been done in this area no consistent correlation between abnormal sleep patterns and bed-wetting have been discovered. Studies have documented that patients with nocturnal enuresis have difficulties waking. Older studies suggest that bed-wetting occurs during slow-wave deep sleep; however, more recent studies suggest that bed-wetting may occur at different stages of the sleep cycle. It is noted in the DSM-IV that most voiding of urine takes place during the REM stage of sleep. Enuresis has been linked with the confusion between reality and fantasy (thinking one is awake when actually asleep), deep sleep or the inability to easily waken, and nightmares and recurrent dreams.

However, these beliefs have been challenged. For example, empirical research by Boyd (1966), as stated in Fletcher, referenced that there is no difference in the soundness of sleep between enuretic and non-enuretic children. (Cendron, 1999).

No correlation has been found between urethral or meatal stenosis and bed-wetting. Furthermore, congenital, structural, or anatomic abnormalities rarely present solely as enuresis. Children with nocturnal enuresis are delayed in achieving this circadian rise in arginine vasopressin and, thus, may develop nocturnal polyuria. This nocturnal polyuria overwhelms the bladder's ability to retain urine until morning. . (Thiedke, 2003).

“Nocturnal enuresis has also been associated with upper airway obstruction in children, and surgical relief of the obstruction by tonsillectomy, adenoidectomy or both was reported to diminish nocturnal enuresis in up to 76 percent of patients”. Limited research fully supporting this theory made validation of this hypothesis difficult. (Welder, Sateia, West & Cendron, 1999).

3. Improper toilet training

This is another disputed cause of bedwetting. This theory was more widely supported in the last century and is still cited by some authors today. Some say bedwetting can be caused by improper toilet training, either by starting the training when the child is too young or by being too forceful. Recent research has shown more mixed results and a connection to toilet training has not been proven or disproven. (Paredes, 2008).

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4. Constipation

Fockema (2005) revealed that, Constipation and encopresis are often associated with NE and studies have shown a relationship between these conditions. Constipation is also often the cause for failed treatment of NE. It was found that 12.4% of all children suffered from constipation and there was an overall prevalence rate of 21.6% of children with NE suffering from constipation.

A prospective cross-sectional study of children with nocturnal enuresis at continence service. Data collected regarding to the child's bowel habits, pattern of enuresis and other history items were obtained from parental questionnaires and paediatrician assessments. Severity of constipation was assessed independently by parents and clinicians. Kappa was used to compare agreement between parental reporting and clinician assessment of constipation. Of the 277 participants aged 4.8-17.5 years (median 8.6 years), 36.1% (n = 95) were identified as constipated by the clinician-based scoring method ('Constipation Score') compared with 14.1% from parental reporting (Kappa = 0.155, P = 0.003). Despite the poor overall recognition of constipation by parents, parental and clinician assessment of frequency of bowel motions (Kappa = 0.804) and soiling (Kappa = 0.384) were similar. Major factors influencing parental reporting of constipation were frequency of bowel motions and soiling with less emphasis on straining and stool consistency. (McGrath KH, Caldwell PH & Jones MP, 2008).

A study to determine the differences or similarities in the clinical presentation between patients with primary and secondary nocturnal enuresis. A total of 170 patients with nocturnal enuresis were assessed at a busy tertiary care pediatric voiding dysfunction clinic at the University of Oklahoma Health Sciences Center. Patients with primary nocturnal enuresis (PNE) were compared with patients with secondary nocturnal enuresis (SNE) for a variety of clinical features, including gender, age when first voiding on their own, age on presentation, infrequent voiding, frequent voiding, urgency, daytime wetting, nocturia, urinary tract infection, constipation, vesico ureteral reflux, attention-deficit/hyperactivity disorder, uroflow results, and ultrasound evidence of a postvoid residual. The only significant difference between the patients with PNE and those with SNE was in the prevalence of constipation. Constipation was significantly associated with PNE (74.59% vs 57.54%; odds ratio: 2.17; 95% confidence interval: 1.07–4.41). When adjusted for a history of constipation, the age at which a child began to void on his or her own became statistically significant**.** (Robson, 2005).

5.Psychological Factors

Although research is inconclusive, some researchers believe that familial and environmental stressors can trigger an enuretic episode. A study, which found that "Enuretic subjects were more likely to have parents who were divorced or separated than Non-Enuretic subjects. It is speculated that because many mothers are awarded custody of the children when marriages split-up, perhaps the separation from or absence of the father-figure takes more of a toll on little boys than on little girls, thereby accounting for their higher frequency of wetting behaviours. Environmental stressors, some of which are out of a person's control, can also be anxiety producing. Major lifestyle disruptions viewed as stress can trigger an enuretic episode. Most of

these episodes fall within the category of secondary enuresis, and a psychological cause can then be associated with the child's enuresis. (Goin, 1998).

Pugner (1997) conducted a study to evaluate nocturnal enuresis to the health care system and families in 5 European countries. The study used Butler's "self image profile" to assess self esteem in children. The study showed that before children had treatment they reported feeling "different from others", "lonely" and "shy". It suggested children with enuresis have a lower than average self esteem and suggests that appropriate treatment is needed for children with nocturnal enuresis.

Joinson (2007) investigated the psychological problems associated with bedwetting and combined (day and night) wetting in children aged around 7.5 years. They collected both wetting and parent-reported data from 8,242 questionnaires distributed to a cohort enrolled in the Avon Longitudinal Study of Parents and Children (ALSPAC). The rates of psychological problems were compared in children with bedwetting, combined wetting, and in children with no wetting problems. The self-report questionnaire given to parents beyond several question on the child's wetting also included "The Development and Well-Being Assessment", comprising questions related to internalising and externalising disorder in children occurring in the present and recent past. The study found a higher rate of parent-reported psychological problems in children with bedwetting and combined wetting compared with those with no wetting problems. This was evident for most outcomes, particularly attention/activity problems, oppositional behaviour, and conduct problems. The exception was social fears and sadness/depression where the combined group were at no greater risk than the controls but rates of these problems were

elevated in children who suffered from bedwetting alone. Children with combined wetting were particularly at risk for externalizing problems.

Centre for reviews and dissemination (2003) stated that, Nocturnal enuresis (bedwetting) is the involuntary loss of urine at night, in the absence of physical disease, at an age when a child could reasonably be expected to be dry (by consensus, at a developmental age of five years). Although bedwetting has a high rate of spontaneous remission, it may bring social and emotional stigma, stress and inconvenience to both the child with enuresis and their family. Children who wet the bed may experience parental disapproval, sibling teasing and repeated treatment failure which may lower self esteem.

“Parents who believe that a child’s bed-wetting is a negative reflection on their parenting skills are most likely to use coercion or punishment to stop the behaviour”. Punishment can break down the parent-child relationship and intensify an already stressful situation. Children who are criticized, humiliated, or punished for their bed-wetting may develop a deep sense of shame, which can create a negative self-image. Because behaviour is a reflection of self-image and self-esteem, a child with negative self-esteem may begin to display additional behavioural problems. (Warzak, 1999).

“It is important that parents have compassion and care when dealing with a bed-wetting child so as to avoid feelings of shame, which is the number one emotion associated with enuresis. Of all the negative emotions, shame is the most devastating for the child, as it often leads to the greatest number of disruptions in personality development. Such disruptions may reveal themselves in poor school performance, antisocial behaviour, isolation, and depression” Parents or caregivers should share with the child that nocturnal enuresis is a fairly common problem among children of

their age and help the child to overcome the problem. Together parents and children should work on ways to diminish feelings of failure and to look for ways to encourage good feelings. It is important to take positive steps together as a team (parent and child) in getting through the problem of enuresis. Parental attitudes toward a child's bed-wetting can make the difference in how a child feels about it and himself/herself. Support and praise will help a child. Shame and punishment will not. Talk with the child about what is happening to him/her. The adult could be the positive influence that he/she needs. Learning about the problem helps both the child and family to cope with their natural concerns. (Greet, 1997)

6. Sleep disorder

Sleep apnea stemming from an upper airway obstruction has been associated with bedwetting. Snoring and enlarged tonsils or adenoids are a sign of potential sleep apnea problems. Sleepwalking can lead to bedwetting. During sleepwalking, the sleepwalker may think he/she is in another room. When the sleepwalker urinates during a sleepwalking episode, he/she usually thinks they are in the bathroom, and therefore urinate where they think the toilet should be. Cases of this have included opening a closet and urinating in it; urinating on the sofa and simply urinating in the middle of the room. Studies show that children wet the bed during all phases of sleep, not just the deepest (stage four, or stages three and four). A recent study, however, showed that enuretic children were harder to wake up. Some literature does show a possible connection between sleep disorders and ADH production. Insufficient ADH might make it more difficult to transition from light sleep to being awake. (Paredes, 2008).

The sleep patterns of enuretic patients have been studied extensively, but the resulting theories are very inconclusive. Studies have documented that patients with nocturnal enuresis have difficulties waking. Older studies suggest that bed-wetting occurs during slow-wave deep sleep; however, more recent studies suggest that bed-wetting may occur at different stages of the sleep cycle. It is noted in the DSM-IV that most voiding of urine takes place during the REM stage of sleep. Enuresis has been linked with the confusion between reality and fantasy (thinking one is awake when actually asleep), deep sleep or the inability to easily waken, and nightmares and recurrent dreams. However, these beliefs have been challenged. For example, empirical research by Boyd (1966), as stated in Fletcher, referenced that there is no difference in the soundness of sleep between enuretic and non-enuretic children. (Welder et al., 1999).

Nocturnal enuresis can take a toll on a child's self-esteem and is a frustrating problem to parents. Feelings of the parents may range from worried to frustrated, sad to angry, and even tired. Children may be able to sense these feelings in parents. Children may feel responsible for their parents' reactions and for upsetting the household. It is important to take positive steps together as a team (parent and child) in getting through the problem of enuresis. Together parents and children should work on ways to diminish feelings of failure and look for ways to encourage good feelings. Parental attitudes toward a child's bed-wetting can make the difference in how a child feels about their bed-wetting problem and him or herself. Support and praise will help a child. Shame and punishment will not. (Goin, 1998).

Children with nocturnal enuresis are “deep sleepers,” compared with their offspring who are not bed-wetters. Other surveys have found that children with nocturnal enuresis are more subject to “confused awakenings,” such as night terrors or sleepwalking, than children who do not wet the bed. (Thiedke, 2003).

Section: II - Studies related to prevalence of nocturnal enuresis in children

The American Psychiatric Association has defined bed-wetter’s as children older than age five who are incontinent of urine at night. The prevalence of nocturnal enuresis has been difficult to estimate because of variations in its definition and in social standards. It is now generally accepted that 15 to 20 percent of children will have some degree of nighttime wetting at five years of age, with a spontaneous resolution rate of approximately 15 percent per year. Therefore, at 15 years of age only 1 to 2 percent of teenagers will still wet the bed. (Cendron, 1999).

Nocturnal enuresis affects approximately 5 to 7 million children in the United States, making it the most common pediatric urologic complaint encountered by primary care physicians. Despite its prevalence, nocturnal enuresis remains incompletely understood, which can frustrate patients, family members, and physicians. Appropriate intervention is justified for the affected child because of the potential consequences of family stress, social withdrawal, and poor self-esteem. (McElderry & Darby, 2001).

Assessment of the prevalence of primary nocturnal enuresis (PNE) and its risk factors in Chinese children and adolescents in the central areas of mainland China. A cross-sectional study of PNE was performed by distributing 11799 self-administered questionnaires to parents of 5–18 year old students in 32 schools of Henan province

China The prevalence decreased with age without gender bias. Of all enuretic children, 21.17% had daytime urinary symptoms and 22.87% had a positive family history. Only 6.08% of PNE had sought professional help. The episodic severity of PNE, associated daytime symptoms, positive family history, and seeking for professional help in adolescent group were significantly higher than those of pediatric group. Age, inhabitation (living in rural or urban areas), arousal dysfunction, associated daytime symptoms and family history were found to be significant predictors of marked PNE. Among PNE cases with a positive family history, there was no significant difference in the familial distribution between boys and girls. (Jian, Guo & Wen, 2005).

The study was to establish the prevalence of enuresis in school children and to determine contributing factors along with treatment methods used in these children in Mumbai. The parents of 1473 children aged between 6-10 years completed a self-administered semi-structured questionnaire. Socio-demographic profiles, enuresis data, medical and psychiatric disorders and family stressors were collected. The data was analyzed and the results presented. The response rate was 89.22%. The overall prevalence of enuresis was 7.61%. Enuresis was more common in boys. A positive family history of enuresis was seen in 28.57% children; 14.29% of the children had daytime wetting as well. Only 24.11% of the parents had taken their child to a doctor for the problem. Family stressors, significant birth history and lower socio-economic status was present to a larger extent in the enuretic group. Scholastic backwardness was also an important factor in this group. This study reports on the prevalence of enuresis in school-going children and stresses on the need for parental education and awareness about this problem. (Avinash et al., 2007).

The prevalence of primary monosymptomatic nocturnal enuresis (PMNE) and assess risk factors that can cause this disease. After the determination of 15 primary schools in the provincial center of Ankara, questionnaires were given to 15,150 students to be answered by their parents. Detailed urologic history was obtained and physical examination applied to the students whose parents answered the questionnaire. A total of 15100 questionnaires were sent, 14103 (93.1%) were returned. Of the 14,103 questionnaires, 79.3% were answered by the mother, 17.7% by the father and 3% by any other carer of the child at home. MNE was determined in 9.0% of the children (n=1266) where as polisymptomatic NE was found in 0.3% (n=43). After exclusion of children with polysymptomatic NE, 14060 questionnaires of MNE patients were evaluated. Regarding age; 0.9% of children are five to six years old, 18.9% - seven years and 19.6% - eight years. The percentages of 9, 10 and 11 year-old children were 20.6, 19.8 and 20.2% respectively. Seven thousand and sixty (50.2%) children were males and 7000 (49.8%) were female. (Secil Ozkan et al., 2010).

A study to determine the prevalence and associated factors of enuresis in turkish children in age group of 6 to 12 years revealed that the overall prevalence of nocturnal and diurnal enuresis were 17.5% (n = 234) and 1.9% (n = 25), respectively. Although male gender, low age, history of enuresis among parents, low educational level of the parents, deep sleep, increased number of siblings, increased number of people sleeping in the child’s room, history of enuresis among siblings, poor school performance and history of recurrent urinary tract infections (UTI) were significantly associated with enuresis, but not with severe enuresis. The percentage of children with enuresis seen by physician for treatment was 17.2%. The most preferred treatment option for enuresis was medications (59.5%), whereas alarm treatment was the least preferred (2.4%). (Cuneyt, 2007).

A cross-sectional study of nocturnal enuresis in Taiwanese school children was performed in 10 primary schools in Tao-Yuan County, Taiwan. Questionnaires on demographic data, familial and physical conditions were completed by 7,225 children assisted by their parents. The overall prevalence of nocturnal enuresis in Taiwanese primary school children was 5.5%. Decreasing age, male gender, family size, birth rank, parental education level and parental raising style were possible familial risk factors for nocturnal enuresis in this study.(Cher, Lin & Hsu, 2005).

A large population based study was carried out to describe the epidemiology of nocturnal enuresis and to outline medical management of the problem. Parents of 1,806 schoolchildren were surveyed and prevalence was ascertained at 13% with two thirds classified as primary enuretics. Significant associated factors included social class, unemployment, family stress and a parental family history of enuresis. Enuretics were more likely to be behind at school, have behavioural problems, soiling and daytime wetting. Enuresis was distressful for the family yet most children never saw a doctor about the problem. In those that did, less than two thirds had a urine test and 40% of parents remained dissatisfied with the outcome of the visit to the doctor. Children were more likely to be prescribed medicine than other treatments whereas the enuresis alarm was recommended for only one in ten children. These findings illustrate that nocturnal enuresis continues to be a problem, that the characteristics of Irish enuretics differ from those in other countries and that medical management of enuresis has room for improvement. (Delvin JB, 1991).

A cross-sectional survey. A total of 3371 self-administered questionnaires were distributed to parents of children aged 7, 9 and 12 years attending four primary schools in Malaysia. The ICD-10 definition of enuresis was used. From an overall

response rate of 73.8%, nocturnal enuresis was reported in 200 children (8%), primary nocturnal enuresis in 156 children (6.2%) and secondary nocturnal enuresis in 44 children (1.8%). 53% of those with primary enuresis had a positive family history, and 54% had two or more wet nights per week. 87% had not sought any form of treatment despite 74% admitting to being embarrassed. Using logistic regression analysis, only three factors were significant predictors of primary nocturnal enuresis. These were: (i) younger age ($P < 0.001$); (ii) male sex ($P < 0.033$); and (iii) Indian ethnic group ($P < 0.044$) compared to Chinese. (Kanaheswari, 2003).

A random sample of 3206 seven-year-old children was studied in order to examine the prevalence of enuresis and associated somatic and genetic risk factors in South Africa. The overall prevalence of enuresis was 9.8% and the figures for nightwetting, day wetting and mixed day and night wetting 6.4%, 1.8% and 1.6% respectively. The prevalence was 9.5% among primary school children, 24.8% among children whose entry to school had been postponed and 26.6% among handicapped and mentally retarded children. If the father had been enuretic after 4 years of age the risk of the child being enuretic was 7.1 times greater than otherwise (95% confidence limits of the risk ratio 5.1–9.8, $p < 0.001$), the corresponding risk ratio when the mother had been enuretic being 5.2 (3.9–7.0, $p < 0.001$). (Jarvelin, Tervonen, Moilanen & Huttunen, 2008).

Section: III - Studies related to treatment of nocturnal enuresis

1. Drug Therapy

Drug therapy remains, by far, the most ‘prescribed’ therapy for enuretic children. There are several prescription medications commonly suggested by medical professionals for children who are bed-wetters. Imipramine (Trofranil), a tricyclic

antidepressant, is typically the drug of choice by physicians. Imipramine was first used in the treatment of primary nocturnal enuresis in the 1960's. Four hypotheses regarding its mechanisms of action have been established. They are "antidepressant effects, changes in sleep and arousal, anticholinergic effects, and stimulation of the antidiuretic hormone production" (Gimpel & Warzak, 1998). The first three hypotheses have received little support in literature. While the last hypothesis is promising, further research is needed. Children treated with imipramine often continue the medication for three to six months; however, an optimal length of treatment has not yet been established. Relapse rate following discontinuation of this drug range from 60% to 95%. Recent review of the drug found that the longer a patient was on imipramine, the less likely he/she was to become dry, thus suggesting that prolonged use of the drug may not necessarily increase the therapeutic benefit or produce lasting results. Imipramine also has been found to have the greatest risk for adverse reactions. Although low doses of imipramine have relatively few serious side effects, adverse reactions have been documented. Most common of these adverse reactions are irritability, reduced appetite, dry mouth, headaches, and increased heart rate. Large overdoses of this drug can be fatal. It is vital that parents supervise the administration of any medications so that accidental overdose does not occur (Gimpel and Warzak, 1998).

Desmopressin acetate (DDAVP) is another commonly used medication in the treatment of primary nocturnal enuresis. DDAVP acts as a synthetic anti-diuretic hormone. Desmopressin affects the kidneys by tricking them to increase water re-absorption in the collecting ducts, resulting in a lower volume of urine. DDAVP was originally formulated as a nasal spray, but a tablet form has recently been developed. DDAVP is successful in decreasing the number of wet nights that a child experiences,

but dryness may not be maintained upon discontinuation of treatment. The percentage of relapse following termination is 50% to 95%. DDAVP usage is recommended on a temporary basis when children wish to stay dry during overnight outings. In general, the side effects for DDAVP are mild, with nasal discomfort, headaches, and abdominal pain among the most common. DDAVP should be administered 30 to 60 minutes prior to bedtime, and fluid intake should be restricted on the evenings it is taken. Seizures have been reported with the use of DDAVP, but it appeared that the patients in which this occurred had consumed excessive fluid, relative to the manufacture's instructions, which resulted in water intoxication and low serum sodium levels. Because of the high rate of relapse and low success rates with most drug therapies, physicians may suggest behavioural therapy or combination therapy. (Gimpel and Warzak, 1998).

2. Alarm therapy

The efficacy of alarm treatment in a sample of Brazilian children and adolescents with nocturnal enuresis and relate treatment success to age and type of clinical support. During 32 weeks, 84 children and adolescents received alarm treatment together with weekly psychological support sessions for individual families or groups of 5 to 10 families. 71% of the participants achieved success, defined as 14 consecutive dry nights. The result was similar for children and adolescents and for individual or group support. The time until success was shorter for participants missing fewer support sessions. Alarm treatment was effective for the present sample, regardless of age or type of support. Missing a higher number of support sessions, which may reflect low motivation for treatment, increased the risk of failure. (Rodrigo, 2010)

The efficacy of bell and pad alarm therapy as an initial and relapse treatment for nocturnal enuresis and to explore risk factors for relapse within 12 months of successful bell and pad alarm therapy. A 22-item questionnaire was sent to 240 children who received bell and pad alarm therapy in a 6-year period via a community centre. The questionnaire recorded demographic characteristics of the child, length of the first bell and pad alarm therapy, outcome of initial treatment and relapse information. The initial response and relapse rates of bell and pad alarm therapy were 84 and 30%, respectively. Female gender, absence of diurnal symptoms and willingness to use alarm therapy were associated with better treatment outcomes. Treatment success was associated with shorter treatment length. The success rate of repeating alarm therapy after relapse was 78%, with an average length of treatment of 10 weeks. (Lillystone, D & Caldwell, P.H, 2009).

The main disadvantage of the alarm is that it takes a great deal of patient effort and motivation. Children, for whom the alarm is effective, generally become dry within two to four months of correct use of the enuresis alarm (Staff, 1995).

3. Behaviour Therapy

There are several Behaviour therapies used to eliminate nocturnal enuresis, many of which incorporate classical and/or operant conditioning, and positive and/or negative reinforcement. Motivational therapy involves reassuring the parent and the child, removing the guilt associated with bed-wetting, and providing emotional support to the child. Emphasis should be placed on the child to take responsibility for his or her bed-wetting by explaining to him/her the condition, reinforcing the fact that he/she did not cause the problem, and teaching him/her that he/she needs to take ownership in the treatment plan. One way to carry out motivational therapy is through

positive reinforcement. This strategy is simply based on promoting desirable behaviour through a reward system. This reward system should serve as a positive reinforcement to the child for achieving dry nights. The rewards can be anything from stickers to money to candy. If the child desires the reinforcer, it will be reinforcing. The use of sticker charts is an excellent tool when using motivation therapy as a treatment measure. The child can record and observe successes, and rewards can be connected to the desired behaviours. The success rate for children receiving motivational therapy has been estimated at 25% to 80%, with a relapse rate of approximately 5% (Cendron, 1999; Goin, 1998). “Motivational therapy appears to be a reasonable first line approach to treating children with primary nocturnal enuresis, especially younger children”. Several procedures may enhance the effectiveness of treatment. Rewards for complying with procedures and for self-monitoring wet and dry nights should be included in the treatment of young children. Incentives for compliance may be more desirable than providing a reward for dry nights, because early successes may be too infrequent for a child to receive positive feedback. Parental support and negative patient perceptions of bed-wetting favour positive outcomes. In addition, children should participate in clean up of bed linens and soiled laundry whenever possible. This should not be viewed as punitive, but as a consequence of the problem. This involvement may be viewed as undesirable by the child and, in turn, become a motivating factor in staying dry (Cendron, 1999).

A randomised or quasi-randomised trials of simple behavioural interventions for nocturnal enuresis in children up to the age of 16. Two reviewers independently assessed the quality of the eligible trials and extracted data. 13 trials met the inclusion criteria, involving 702 children of whom 387 received a simple behavioural intervention. However, within each comparison each outcome was addressed by

single trials only, precluding meta-analysis. In single small trials, reward systems (e.g. star charts), lifting and waking were each associated with significantly fewer wet nights, higher cure rates and lower relapse rates compared to controls. One small trial of poor quality suggested that star charts were initially less successful than amitriptyline but this difference did not persist after the treatments stopped. Simple behavioural methods may be effective for some children, but further trials are needed, However, simple methods could be tried as first line therapy before considering alarms or drugs, because these alternative treatments may be more demanding and may have adverse effects. (Glazener, 2005).

One randomised controlled trial, Harris (1977) compared retention control training to no treatment. Harris (1977) considered only children with bedwetting. Retention control training was described as 5 nights in a camp, then 30 days with parents, on the first day the child was asked to drink fluid and the time to void was recorded as was the volume voided. After this children were encouraged to hold for longer, and were given 1 point for each extra 2 minutes held. The child was then taught that the longer they held the more urine they passed. Once the child understood this they were given points based on the amount of urine passed. Points were exchanged for toys and games etc.

Simple behavioural interventions are widely used as standard first line treatment.

- Lifting: involves taking the child to the toilet during the night usually before the time that bedwetting is expected, without necessarily waking the child.
- Waking: involves waking the child to allow him/her to get up and urinate.
- Reward systems (e.g. star charts): the child might receive a star for every dry night, and a reward after a preset number of stars have been earned.

- Retention control training: attempting to increase the functional bladder capacity by delaying urination for extended periods of time during the day.
- Stop-start training: teaching children to interrupt their stream of urine in order to strengthen their pelvic floor muscles
- Dry bed training can include enuresis alarms, waking routines, positive practice, cleanliness training, bladder training, and rewards. (Glazener, 2003)

4. Counselling

Sometimes individual or family counselling is the most appropriate and beneficial treatment for the child suffering from primary nocturnal enuresis, particularly when stress or anxiety appear to be the primary cause. From the counsellor's perspective, bed-wetting is viewed as a symptom to an underlying problem. Counselling may not only help with the cessation of bed-wetting, but effective sessions can also play a role in improving or repairing family relationships**.** (Kimberly, 2006).

A study examined the effectiveness of a comprehensive behavioural and educational nocturnal enuresis management program. One hundred fifty patients aged between 5-17 years with nocturnal enuresis a minimum of 5 nights a week for two months began the Center for Enuresis Control case management program from December 1999 to September 2000. The programme is a comprehensive, multidimensional treatment plan with consistent follow-up. The program included enuresis education, motivational counselling, enuresis alarms, physical interventions, feedback, and bi-weekly report cards. Instructions were provided to the participants directly over the phone and with follow-up written material. Self-esteem was assessed using the Childhood Health Questionnaire (CHQ-PF28).One hundred fifteen patients

were started on the program, 104 (90.4%) were declared dry (69.3% of patients were dry on an intent-to-treat basis). Responders to the program with a pre-intervention indication of impaired self-esteem experienced a 7.4% increase in self-esteem scores. The comprehensive behavioural and educational nocturnal enuresis management program examined in this study was effective in controlling nocturnal enuresis and improving patient self-esteem. (Egan & Voorhees, 2000).

5. Accupuncture

A study reveals that, 111 patients aged between 5 to 15 years were assigned randomly to two different forms of acupuncture. In the treatment group, a needle was embedded under the skin and left in place; in the control group, a needle was placed on the skin surface for 30 minutes each day. The number of treatment courses (of 6 days each) depended on response; follow-up times were not reported. At the end of the study, 54% (30/56) of patients in the treatment group attained 14 consecutive dry nights compared with 31% (17/55) in the control group. Adverse events were not mentioned. (Denise Adams et al., 2010).

6. Hypnotherapy

Nocturnal enuresis represents a practical, social and emotional problem. This study illustrates the advantage of using hypnosis as a therapy. Twelve boys, median age 12 years (range 8-16), eight with primary nocturnal enuresis and four with primary nocturnal enuresis, reported at referral a median of 0 (range 0-3) dry nights per week. All had a family history of enuresis and had used enuresis alarm and Desmopressin; 50% used Imipramin. Eight had been referred to psychological or psychiatric services for treatment. All had undergone a somatic assessment by a paediatrician, a paediatric surgeon, or an urologist. After a preliminary assessment of

motivation, they underwent hypnotherapy with a median of six sessions (range 2-8), followed by median one month with self-hypnosis exercises. At follow-up after three months and one year, nine out of 12 patients had respectively 6-7/7, and 7/7 dry nights per week. Three had nocturnal enuresis at follow-up; two of them were referred to a paediatric surgeon for their overactive urine bladder and one was referred to his local psychiatric clinic because of ongoing family conflicts. Hypnotherapy had lasting effects for boys with chronic and complex forms of nocturnal enuresis. (Diseth & Vandvik, 2004).

A study was conducted to assess the efficacy of hypnotherapy in the treatment of nocturnal enuresis. Subjects were 48 nocturnal enuretic boys, aged 8-13 yr. Treatment consisted of six standardized sessions, one hourly session per subject per week. Results indicated that hypnotherapy was significantly effective over 6 months in decreasing nocturnal enuresis, compared with both pre-treatment baseline enuresis frequency and no-treatment controls. It also suggested that trance induction was not a necessary prerequisite for success. Comparison with other methods of treatment provided evidence that hypnotherapy was an effective alternative or adjunctive form of treatment for enuresis. (Edwards SD & Spuy HI, 1985).

Section: IV - Studies related to the effectiveness of behaviour modification therapy in controlling the nocturnal enuresis in children.

A study revealed that, to assess the effect of intensive behaviour therapy on Saudi children with primary Enuresis. Twenty-six children, aged 6-14-years, presented with complaints of bed wetting during a 12-months period from January 2001 through to January 2002, ArAr Central Hospital, Kingdom of Saudi Arabia were

studied in an interventional, non-randomized trial without control. After complete verbal autopsy, physical examination and laboratory investigation, they were offered intensive behaviour therapy. They were evaluated for response, regularity, esteem and recurrence of enuresis. This result shows an excellent response to intensive behaviour therapy in primary enuresis if the follow up is regular. (Saui, 2004).

A randomized controlled trail on the short term and long term of simple behaviour intervention for nocturnal enuresis in young children was conducted in Netherlands. Nocturnal enuresis occurs in up to 10% of 10-year-old children and that boys have higher rates of enuresis at older ages than do girls. Behavioural treatments for enuresis, including alarms, can be used beginning at 5 to 7 years of age. Success rates (at least 14 nights dry in a row) at 6 months after enrollment were 21% in the control group, 27% in the lifting with password group, 37% in the lifting without password group, and 32% in the star chart/reward group. The difference between the lifting without password group (37%) and the control group (21%) was the only statistically significant difference. At follow-up obtained from 64% of participants at a mean follow-up time of 2.6 years, the success rates were 69% for the control group and 76% to 78% for the other groups; these differences were not statistically significant. (Dommelen, Kamphuis & Leerdam F JM et al, 2009).

An epidemiological cross-sectional study was carried out with a questionnaire completed by the parents of children attending primary school and aged from 5 to 14 years old. The study was conducted in Khartoum schools by selecting randomly 280 children from 7 different schools and sending home the questionnaire along with the consent form to their parents. 218 questionnaires were collected from the total 280 questionnaires giving a responding rate of 77.8% and were Considered valid for

statistical significance. Regarding treatment modalities used for stopping the bedwetting, it was shown that 32.2% of the parents force their children to go to the bathroom before going to bed.22.3% prevent them from drinking lots of liquids before going to bed.25.7% wake their children up at night to go to the bathroom. And finally only 11.4%warn and scorn their children for not repeating it. It also depended on the level of education Although it was not strongly correlated. In conclusion, as can be expected by conventional wisdom and seen by literature, Nocturnal enuresis (NE) is prevalent in Sudan among children of 5-14 years of age. Parents should not become overwhelmed with feelings of frustration or failure due to their child's bed-wetting. Although there are no easy answers or quick fixes for the issue of bedwetting it's important to take positive steps together as a team (parents and child) in getting through nocturnal enuresis and especially its effect on our children. Support and praise will help a child. Shame and punishment will not.(Magdi et al., 2010).

Recent studies suggest the efficacy of behavioral therapy for enuresis, even in cases of minor daytime voiding problems. We describe our experience with the clinical followup and behavioral therapy of children with primary enuresis. We followed 159 boys and 91 girls of 5 to 17 years old with primary enuresis who were treated at 3 medical centers with a pediatric nephrology clinic during the last 3 years. A detailed voiding history was obtained. Each child was treated with a bladder training session, including an explanation of the enuretic process, daily diary recording and training to recognize bladder distention and increase voiding frequency. A total of 226 children (90%) presented with 1 or more symptoms of bladder maturation delay and 13% reported behavioural constipation. Of the patients 185 (74%) completed the proposed treatment, including 111 (60%) who reported a positive and 21 (11%) who reported a partial response. In 53 children (29%) the

treatment failed. Most children with enuresis have daytime symptoms when an accurate history is recorded. As shown by our data, the efficacy of behavioral therapy is comparable to that of desmopressin or alarm therapy but it requires good compliance of the child with the therapeutic plan. Age is not a determining factor in the success rate. (Pennesi, 2004).

Kegel exercises involve purposeful manipulation of the muscles to prematurely terminate urination. Originally developed for stress incontinence in women, a version of these exercises called stream interruption is often used in NE treatment packages (e.g., Friman, 1995; Friman & Jones, 1998). For children, stream interruption requires initiating and terminating urine flow at least once a day during a urinary episode. “Dry practice” or actual Kegel exercises can be practiced far more frequently once the child has learned to detect and manipulate the requisite musculature while conducting stream interruption. Dry contraction of pelvic musculature consists of the child “holding” a contraction for 5 to 10 seconds, followed by a 5-s rest, at least 10 times on three separate occasions per day (Schneider et al., 1994).

Behavioural therapy has proved benefit for children with daytime wetting but most studies have used biofeedback techniques and provide no long-term assessment of results. We previously reported similar results using simple behavioural therapy without biofeedback. We report the long-term efficacy of behavioural therapy for daytime wetting. Our program of behavioural therapy included timed voiding, modification of fluid intake, positive reinforcement techniques and pelvic floor (Kegel) exercises to promote pelvic floor strengthening and relaxation. Questionnaires to assess therapeutic efficacy were mailed to patients who had completed therapy more than 1 year previously. A total of 48 patients responded. Mean ages at the time

of the initial clinic visit and questionnaire were 8.2 and 12.9 years, respectively. Improvement in symptoms was noted in approximately 74% of the cases during the first year following therapy. At a mean of 4.7 years after treatment 59.4% of the patients had improved daytime urinary control, 51.1% improved daytime urinary frequency and 45.6% improved daytime urinary urgency. The frequency of urinary tract infections decreased in 56.4% of the cases. Measures of psychological well-being were also noted to be improved in a majority of patients. A total of 77.3% of the patients stated that they would recommend the program to others. Simple behavioural therapy without biofeedback techniques is an effective and durable first line therapy for children with daytime wetting. (**Wiener, 2000).**

Enuresis is a chronic and prevalent disorder associated with childhood. Although nocturnal enuresis can be successfully hidden from outsiders, it is nevertheless annoying and destructive to family relationships. Behaviour modification procedures have been most effective and efficient for treating enuresis. Three behaviour modification approaches are presented with application suggestions for enuretic types elicited from interview data. Few problems regarding the development of children cause more concern to parents and professionals than enuresis. The problem is common and generally ranks second to school problems as the primary behavioural complaint to primary physicians or specialists.' Parents tend to focus on this symptom, and the conflict between them and their children generally accelerates in geometric proportions, probably because, in our culture, bedwetting is rigidly enveloped in embarrassment, secrecy, and shame. Enuresis tends to provide a visible sign to others of psychosexual difficulties, negative self-concept, and emotional disturbance. (Thomas & Kansas, 1982).

Behavioural therapy is unfortunately the least popular approach to enuresis - being employed by only about 10% of pediatricians. This is perhaps because it is very "labor intensive" - requiring frequent long visits, talking with the child over many months time. It works best when the child is old enough to care about and take "ownership" of the problem, AND when it is closely supervised by a pediatrician or behavioural psychologist trained in it's use. The program should be something the child and I are working on together (with parental help), not something the parent and I (or the parent alone) are "doing to" the child. It is also not something a kid should be working on by themselves with parental "coaching". Before I start a course of behavioural therapy, I like to see that the problem is bothering the child as much (or more) than it's bothering the parent, and that the child is cognitively ready to go home and "work on a project" or "practice" something independently. A good guide: when a child is ready to start taking lessons to play a musical instrument, he's probably also ready for behavioural bedwetting treatment. If you wait for these criteria to be met, the success rate of this approach within a year will be 60-80%, with a relapse rate of only 10-20%. If you don't wait for these criteria to be met, you are setting yourself and the kid up for a frustrating experience. (Mathiew & North Andover, 2010).

There is no one universally successful treatment for nocturnal enuresis. Successful treatment of nocturnal enuresis requires therapy directed simultaneously at each of the three pathophysiological causes of bedwetting. Behavioural therapy offers the potential to cure nocturnal enuresis without the need for a medication. The fundamentals of behavioural therapy include achievement of good bladder and bowel health, improved arousal, and an optimal circadian rhythm of urine production. Successful behavioural therapy requires a supportive parent, a motivated child, patience, and an average of about 6 months of therapy. Compliance improves when

parents and children have a good enough understanding of the problem such that the suggested behavioural modifications make sense. A programme with personalized calendars of bladder and bowel parameters, a series of realistic goals between appointments, and monthly follow up to sustain motivation improves the outcome. Behavioural therapy should be offered to every child with nocturnal enuresis. (Robson, 2008).

CHAPTER – III

RESEARCH METHODOLOGY

The methodology of research indicates the general pattern of organizing the procedure for gathering valid and reliable data for an investigation. This chapter provides a brief description of the method adopted by the investigator. It includes research approach, research design, the setting, the population, sample and criteria for sample selection. It further deals with the development of the tool, its validity, reliability, pilot study, procedure for data collection, and plan for data analysis protection of human rights.

RESEARCH APPROACH:

The experimental study explores different dimensions of a phenomenon with the help of a hypothesis and attempts to test the relationship between the phenomena and the hypothesis (Polit 2001). This study aims at evaluating the effectiveness of behaviour modification therapy in treating nocturnal enuresis among children in the age group of 5 to 10 years using experimental approach.

RESEARCH DESIGN:

True experimental pre test – post test control group design was adopted for this study. This can be represented by

GROUP		PRETEST	INTERVENTION	POSTTEST
Experimental group	R	O_1	X	O_2
Control group	R	O_3	-	O_4

O_1 – Measurement of pre test nocturnal enuresis level before manipulation in experimental group.

O_2 – Measurement of post test nocturnal enuresis level after manipulation in experimental group.

X – Intervention (Behaviour modification therapy)

O_3 – Measurement of pre test nocturnal enuresis level in control group.

O_4 – Measurement of post test nocturnal enuresis level in Control group.

R – Randomization.

Variables

Dependent variable – Nocturnal enuresis

Independent variable – Behaviour modification therapy.

SETTING OF THE STUDY

The study was conducted in selected rural areas in Madurai such as karugalakudi and Pettai. These areas are 30 kms away from Sacred Heart Nursing College. The total population of Karungalakudi village was 2807. There was 257 children in the age group of 5 to 10 years. Pettai village has a population of 992 with 99 children in the age group of 5 to 10 years. The health services are provided by Karugalakudi Primary Health Centre which is 1km away from Karugalakudi and Pettai. There is a middle school and high school available in this village. Both areas are similar in demographic characteristics but away from each other. These villages were selected for the study considering the rural background and feasibility to conduct the study.

TARGET POPULATION:

The target population was children of 5 to 10 years of children residing in karungalakudi and Pettai.

SAMPLE:

Children with nocturnal enuresis in the age of 5-10 years who belonged to karungalakudi and Pettai, who fulfilled the inclusion and exclusion criteria

SAMPLE SIZE:

The sample size consists of 100 children, among that 50 were allotted in experimental group and 50 in control group respectively.

SAMPLING TECHNIQUE:

PHASE-I Selection of setting:

Out of 5 villages in Block PHC under Karungalakudi, among 2 villages namely, Karungalakudi and Pettai were selected using simple random sampling technique.

PHASE-II Selection of subjects:

All the children in both the villages were screened for prevalence of nocturnal enuresis. Among those found with nocturnal enuresis and those who fulfilled the inclusion criteria were included for the study.

Out of the total 257 children in Karungalakudi 110 were found with nocturnal enuresis using simple random sampling technique from this group 50 children were selected and alotted to experimental group (n-50). Out of 99 children in Pettai 60 were found with nocturnal enuresis from them 50 children were selected and alotted to control group (n-50) using simple random sampling technique.

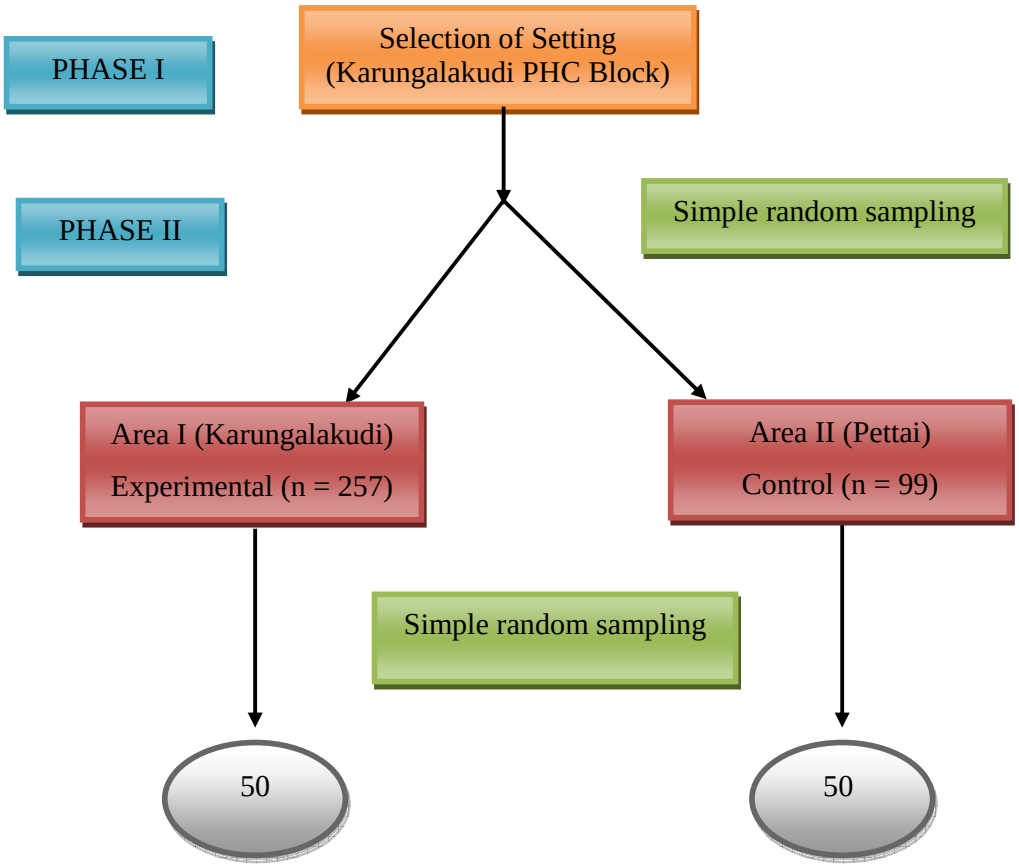

Fig 2. True experimental pre test – post test control group design.

CRITERIA FOR SELECTING THE SAMPLE:

Inclusion Criteria:

The sample were selected on the basis of the following criteria.

- Enuretic children with in age group of 5 to 10 years.
- Enuretic children from both sex

Exclusion Criteria:

- Children with any associated illness or major complications.
- Children who had surgery in genital region.

DESCRIPTION OF THE RESEARCH TOOL:

Part I:

- Demographic data of the children and their parents include age, sex, type of family, number of children, income of the family, education level of mother, father etc
- Clinical profile.
- Contributing factors for nocturnal enuresis.

Part II:

- Nocturnal enuretic rating scale.

Description of the tool:

Part – I (Appendix-IV)

- Socio demographic profile

It comprised of demographic data of the children with nocturnal enuresis such as, age, sex, birth order of the child, no of siblings, care taker, income of the family, education level of father and mother, occupation of father and mother.

- Clinical profile

It comprised of clinical profile of the children with nocturnal enuresis such as, history of enuresis in parents, history of enuresis in siblings, history of UTI, history of surgery in genital area, pain during voiding, day time incontinence, day time urgency, toilet training started at the age, habit of bedwetting, bed wetting time at night, consultation with physician.

- Contributing factor for nocturnal enuresis.

It comprised of contributing factors associated with enuretic pattern such as, problem in studying, going to school is frightening, teacher has punished/scolded in front of others, fighting with friends in school, comfortable with school toilets, avoid using school toilets, frightening situation in family, being compelled for academic achievement, fear of toilet, having nightmare, fear of animal, having punished the child for bed wetting, self- esteem is affected by bed wetting habit, feel bad about habit of bedwetting.

Part II – Nocturnal enuretic rating scale (Appendix-IV.a)

It has 5 numbers of items. Each had a rating with nil, occasionally, frequently, always on frequency of bet wetting, sleep interrupted with bed wetting, wake but avoid going to toilet, drinking water frequently in the evening hours, complaints of constipation. All the items were scored like 0,1,2,3 respectively.

Nil	–	no behaviour
Occasionally	–	1-3times/month
Frequently	–	4-6times/month
Always	–	everyday.

Interpretation:

If the test score is

0 - 5	-	Mild
6 -10	-	Moderate
11-15	-	Severe

TESTING OF THE TOOL

Validity:

Validity of the tool was established by submitting the tool to five experts from community medicine, Urologist, Psychologist, Pediatrician, nursing specialist in community health nursing specialist. Based on their valuable suggestions, reforming of tool was done and the validity was established.

Reliability:

Using Test Retest method reliability was established. Nocturnal enuretic questionnaires were administered to 5 samples and after 2 weeks the same questionnaires were readministered. The calculated ‘r’ value was 0.86 which showed that tool was reliable.

Description of the Intervention:

This refers to series of activities the mother was asked to carryout including, Lifting, waking, stop-start training, good bladder recommendation, treatment of nocturnal polyuria, retention control training, reinforcement therapy.

PILOT STUDY:

In order to test the relevance and practicability of the study, a pilot study was conducted among 10 children. Data were analyzed to find out the suitability. The findings of the Pilot study revealed that the study was feasible. The pilot study participants were excluded from the main study.

Before starting the study, the researcher met the Panchayat president of the selected villages, the village health nurse and the ICDS worker and obtained oral permission for conducting the study.

Phase I: Screening for prevalence of nocturnal enuresis.

All the children in the selected setting were screened for prevalence of nocturnal enuresis. Door to door the mother were approached and asked if the child had history of bet wetting atleast once a month in the past 6 months.

Phase II: Implementation of intervention

All the mother's of enuretic children were gathered in the ICDS center of Karungalakudi village. In a day 25 mothers were gathered. The objectives of the study were explained. The pretesting was done using the tool. Following the pretest, the intervention was given. Before that a brief introduction about nocturnal enuresis was given. Then using the pamphlets the behaviour modification therapies and need for controlling nocturnal enuresis was discussed. Therapies discussed were,

- **Lifting:** Taking the child to the toilet during the night usually before the time that Bedwetting is expected, without necessarily waking the child.
- **Waking:** Waking the child to allow him/her to get up and urinate.
- **Stop-start training:** Teaching the child to interrupt their stream of urine in order to strengthen their pelvic floor muscles
- **Good bladder health recommendations:** instructing the child to void regularly enough to avoid urgency and urgency incontinence.
- **Treatment of nocturnal polyuria:** providing a liberal water during the day, especially during the morning and early afternoon hours at school.
- **Retention control training:** Encouraging a bowel movement before the child leaves for school. Drinking a liberal amount of water, avoiding foods known to cause hard stool, and choosing foods that soften the stool, so as to have good bowel health.

- **Reinforcement therapy:** mother should reward the child who practices the above therapies. The rewards can be candy or stationary things like scale, pencil, rubber awarded to the child for achieving dry nights. (Appendix-V)

PROCEDURE FOR DATA COLLECTION

The following schedule was adopted for the above phase of data collection process.

Time Duration	Activities
1st Week 27.6.11 – 2.7.11	• Survey conducted in both villages. • Prevalence was estimated. • Pre-test was given
2nd – 5th week 4.7.11 – 23.7.11 6th Week 1.8.11 to 6.8.11	• All the children with the mother formed a group and were explained about behavioral modification therapy. • They were asked to carry on with the therapy for 5 weeks and maintain the diary. • The investigator checked the diary everyday and rewarded the child if they followed the above therapies. • After 28th day post test assessment was done for both groups in Karungalakudi & Pettai taking 10 samples per day.

Plan for Data Analysis:

Data analysis was done in accordance with the objective of the study. The data were organized, tabulated and were analyzed as follows.

- Descriptive statistics was used such as number and percentage mean to describe demographic data.
- To find out the level of significance ‘t’ test was used.
- Chi – square was used to determine the association between the variables.

PROTECTION OF HUMAN SUBJECTS:

The proposed study was conducted after the approval of dissertation committee of the college. Permission was obtained from the village panchayat president and the deputy director of health services and the village health nurses of selected village. Oral consent from mother was obtained before starting the data collection.

SUMMARY

This chapter dealt with the research approach, design, setting, population, sample and sampling technique, development of data collection tools and testing the tool, behaviour modification therapy, pilot study, data collection procedure, plan for data analysis and protection of human rights.

CHAPTER – IV

ANALYSIS AND INTERPRETATION DATA

"Data is only meaningful when grouped and analyzed". Statistical analysis is a method for rendering quantitative information meaningful. It enables the researcher to reduce, summarize, organize, evaluate, interpret and communicate numeric information.

(Polit, 2001).

In this study, the researcher collected data among 100 children in the age group of 5 to 10 years with 50 as experimental group and 50 as control group using simple random sampling technique.

Organization of the Finding:

The analysis of the data are organized and presented under the following headings.

Section I:

a. Frequency and percentage distribution of subjects in the experimental group and control group based on their demographic data.
b. Distribution of children in both experimental group & control group according to the clinical profile of nocturnal enuresis.
c. Distribution of children in experimental & control group according to contributing factors related to nocturnal enuresis.

Section II:

a. Prevalence of Nocturnal enuresis among children in both villages.

Section III:

a. Distribution of children in experimental group according to pre-test and post test level of nocturnal enuresis.
b. Distribution of children in experimental group according to the pre test and post test level of nocturnal enuresis (symptom wise).
c. Distribution of children in control group according to the pre test and post test level of nocturnal enuresis.
d. Distribution of children in control group according to the pre test and post test level of nocturnal enuresis (symptom wise).

Section IV: effectiveness of behaviour modification therapy

a. Comparison of mean pre test & post-test nocturnal enuretic score of children in experimental group.
b. Comparison of post-test level of nocturnal enuresis between experimental and control group.
c. Comparison of mean post-test nocturnal enuretic score between experimental group and control group.

Section V:

a. Association between pre-test nocturnal enuretic score in experimental group and selected demographic variables.
b. Association between pre test nocturnal enuretic score in experimental group and selected clinical profile.

Association between pre test nocturnal enuretic score in experimental group and selected contributing factors related to nocturnal enuresis.

SECTION I

This section describes the characteristics of the control group and experimental group in relation to demographic variables as such as age, sex, education level of father and mother, birth order, type of family.

Table: 1

Frequency and percentage distribution of subjects according to demographic variables.

Demographic variables	Experimental Group (n = 50)		Control group (n=50)		Total (N=100)	
	f	%	f	%	F	%
Age of the child						
5-6	20	40	20	40	40	40
7-8	19	38	17	34	36	36
9-10	11	22	13	26	24	24
Sex of the child						
Male	18	36	19	38	37	37
Female	32	64	31	62	63	63
Birth order of the child						
1	25	50	33	66	58	58
2	22	44	14	28	36	36
3	2	4	2	4	4	4
>3	1	2	1	2	2	2
No of siblings						
1	20	40	16	32	36	36
2	5	10	2	4	7	7
>2	2	4	-	-	2	2
Nil	23	46	32	64	55	55

Table 1 to be (Contd…)

Caretaker						
Mother	49	98	47	94	96	96
Father	-	-	3	6	3	3
Others	1	2	-	-	1	1
Income of the family (in rupees)						
<2500	21	42	8	16	29	29
2501-5000	12	24	14	28	26	26
>5000	17	34	28	56	45	45
Education level of father						
Illiterate	17	34	17	34	34	34
Primary	16	32	24	48	40	40
Secondary	14	28	7	14	21	21
Higher secondary	1	2	2	4	3	3
Graduate	2	4	-	-	2	2
Education level of mother						
Illiterate	21	42	17	34	38	38
Primary	16	32	24	48	40	40
Secondary	10	20	7	14	17	17
Higher secondary	2	4	1	2	3	3
Graduate	1	2	1	2	2	2
Occupation of the mother						
Skilled	1	2	1	2	2	2
Semiskilled	1	2	3	6	4	4
Unskilled	13	26	9	18	22	22
Unemployed	35	70	37	74	72	72
Occupation of the father						
Professional	9	18	8	16	17	17
Skilled	2	4	-	-	2	2
Semiskilled	8	16	12	24	20	20
Unskilled	30	60	30	60	60	60
Unemployed	1	2	-	-	1	1
Both parents are living together						
Yes	49	98	50	100	99	99
If no	1	2	-	-	1	1
1) Death						
2) Separated	-	-	-	-	-	

With regard to age, 40% of children in both the groups belonged to 5-10 years of age. More than one third of children (63%) in both groups were of females. In experimental group nearly half that is, 25(50%) and 33 (66%) in control group were the first child with regard to order of birth. Care taker of the total sample indicated an overwhelming majority (96%) of them being cared by mother. Regarding number of siblings, nearly half of the sample had one sibling.

Of the total sample, 45% of them earned more than Rs.5000 per month, nearly one fourth of them earned below Rs.5000 per month. Educational level of father depicted, nearly one third (40%) of the sample completed up to primary education, whereas 34% of the sample were illiterate. Among the total sample, less than 40% of the mother were completed primary education, less than one third of the subject's mother were illiterate. In total sample, most of the mother were housewife, more than one fifth (22%) of the mother were doing unskilled work. Regarding occupation of the father, nearly more than half (60%) of the father were doing unskilled work. Majority (99%) of the sample's parents were living together.

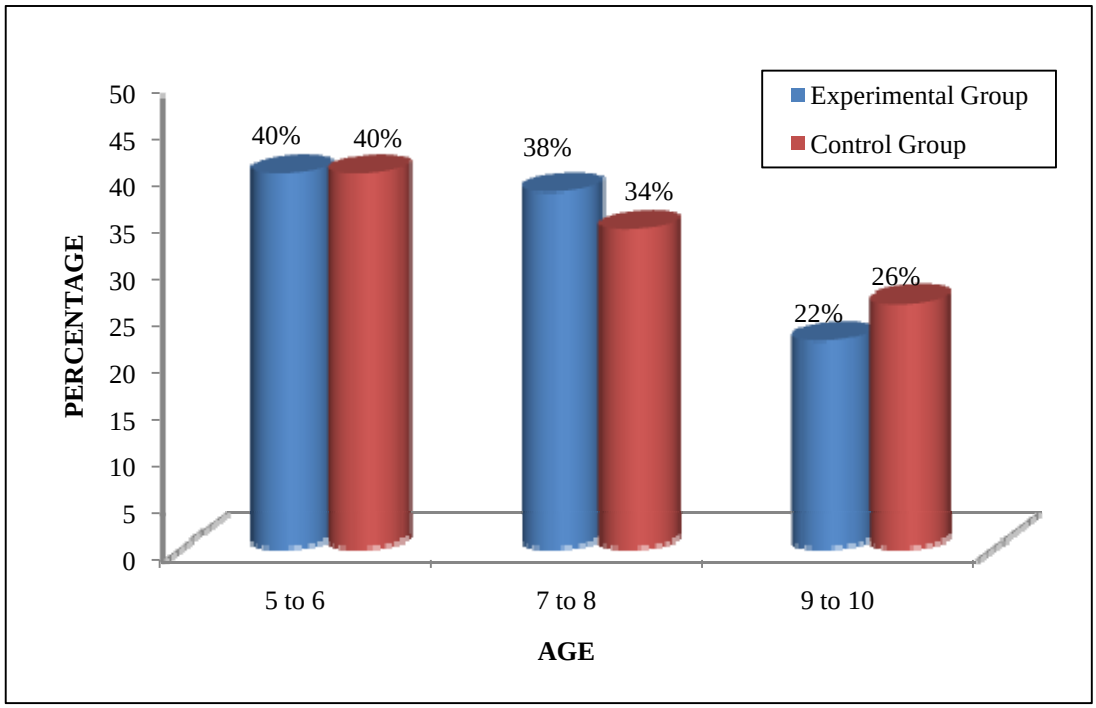

Fig-3:- Distribution of sample based on age

Table-2

Distribution of children in both experimental group & control group according to the clinical profile of nocturnal enuresis.

N=100

	Clinical profile	Experimental group		Control group		Total	
		f	**%**	**f**	**%**	**F**	**%**
1	**Previous history of enuresis in parents**						
	Yes	4	8	1	2	5	5
	No	17	34	29	58	48	48
	Don't know	30	60	20	40	50	50
2	**Past history of enuresis in sibling**	3	6	-	-	3	3
	Yes	3	6	-	-	3	3
	No	43	86	45	90	88	88
	Don't know	3	6	5	10	8	8
3	**History of UTI**						
	Yes	1	2	-	-	1	1
	No	49	98	50	100	99	99
4	**History of surgery in genital area**						
	Yes	-	-	-	-	-	-
	No	50	100	50	100	100	100
5	**Pain during voiding**						
	Yes	1	2	-	-	1	1
	No	49	98	50	100	99	99
6	**Daytime incontinence**						
	Yes	3	6	-	-	3	3
	No	47	94	50	100	97	97
7	**Daytime urgency**						
	Yes	1	2	1	2	2	2
	No	49	98	49	98	98	98

Table 1 to be (Contd…)

8	**Toilet training started at the age of**						
	<3 years	4	8	1	2	5	5
	>3 years	46	92	49	98	95	95
9	**Habit of bedwetting**						
	<6 months	-	-	1	2	1	1
	>6 months	50	100	49	98	99	99
10	**Bedwetting time at night**						
	2 hours after asleep	-	-	-	-	-	-
	Midnight	43	86	34	68	77	77
	Early morning	7	14	16	32	23	23
11	**Consulted with physician for bedwetting.**						
	Yes	-	-	-	-	-	-
	No	50	100	50	100	100	100
12	**Have you tried any behavior modification therapy for nocturnal enuresis**						
	If yes	-	-	-	-	-	-
	1) Regularly						
	2) Occasionally	4	8	-	-	4	4
	No	46	92	50	100	96	96

With regard to previous history of enuresis in parents, half of them (50%) don't know. Of the total sample overwhelming majority 88% had past history of enuresis in siblings. Majority of the sample 99% had no history of UTI. All the 100 sample who participated in present study had no history of surgery in genital area. Pain during voiding, reveals an overwhelming majority 99% of them not had pain during voiding.

Regarding day time incontinence, 97% of them not had the problem. Mostly, 98% of subjects not had daytime urgency.

Of the total sample, 95% of them were started toilet training at <3 years of age. Regarding habit of bedwetting, 99% of the subjects had >6 months period. Bedwetting time at night reveals an overwhelming majority 77% of them had at midnight and 23% of them had at early morning. All the 100 sample who participated in the present study had no consultation with physician for bedwetting. With regard behaviour modification therapy, 96% of them had not tried any therapies, only 4% of them tried occasionally.

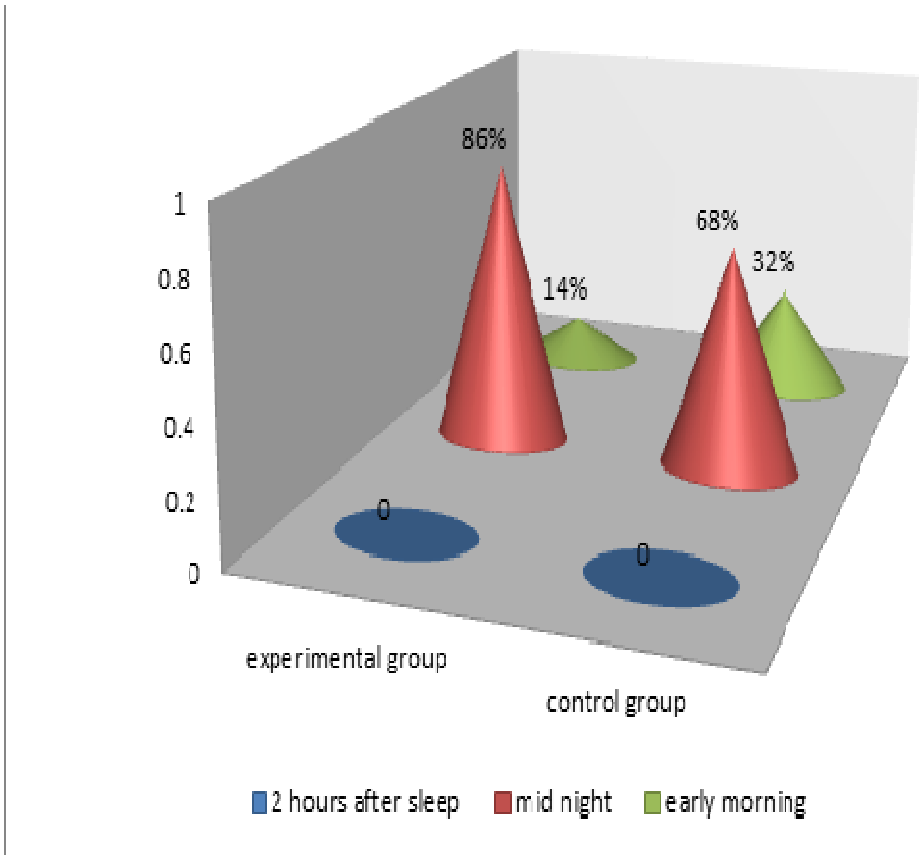

Fig -4 Distribution of sample based on the time of bed wetting at night

Table-3

Distribution of children in experimental & control group according to contributing factors related to nocturnal enuresis.

N=100

	Contributing factors	Experimental group		Control group		Total	
		f	%	f	%	F	%
	Factors related to school						
1	**Problem in studying**						
	Yes	10	20	5	10	15	15
	No	40	80	45	90	85	85
2	**Going to school is frightening**						
	Yes	3	6	2	4	5	5
	No	47	94	48	96	95	95
3	**Teacher has punished/scolded in front of others**						
	No	11	22	11	22	22	22
	Occasionally	24	48	29	58	53	53
	Frequently	14	28	8	16	22	22
	Always	1	2	2	4	3	3
4	**Fighting with friends in school**						
	No	7	14	7	14	14	14
	Occasionally	26	52	24	48	50	50
	Frequently	16	32	12	24	28	28
	Always	1	2	7	14	8	8
5	**Comfortable with school toilets**						
	Yes	41	82	45	90	86	86
	No	9	18	5	10	14	14
6	**Avoid using toilet at school**						
	Yes	-	-	4	8	4	4
	No	50	100	46	92	96	96
	Factors related to home						
7	**Frightening situation in family**						
	Yes	4	8	4	8	8	8
	No	46	92	46	92	92	92

Table 1 to be (Contd…)

8	**Being compelled for academic achievement**						
	Yes	5	10	6	12	11	11
	No	45	90	44	88	89	89
9	**Fear of toilet**						
	Yes	19	38	34	68	53	53
	No	31	62	16	32	47	47
10	**Child having nightmare**						
	Yes	39	78	45	90	84	84
	No	11	22	5	10	16	16
11	**Fear of animals**						
	Yes	33	66	37	74	70	70
	No	17	34	13	26	30	30
12	**Having punished the child for bedwetting**						
	Yes	34	68	32	64	66	66
	No	16	32	18	36	34	34
13	**Self-esteem is affected by bedwetting habit**						
	If yes	18	36	12	24	30	30
	1. Cry						
	2. Guilty	11	22	19	38	30	30
	3. Afraid	13	26	13	26	26	26
	4. avoid outstaying	5	10	5	10	10	10
	No	3	6	1	2	4	4
14	**Feel bad about habit of bedwetting**						
	Yes	38	76	45	90	83	83
	No	12	24	5	10	17	17

Majority of them 85% not had any problem in studying. Of the total sample, 95% of them were frightened to go school. Totally, 53% of the sample were punished/scolded occasionally, 22% of them were punished frequently. Nearly, half of the sample were fight occasionally with friends in school. Regarding comfortable with school toilets, 86% of them were comfortable. Mostly, (96%) of them were using

school toilet. Majority of them (92%) were not experienced frightening situation in home. In total sample (89%) of them were not compelled for academic achievement. Fear of toilets depicted, more than half (53%) of them had fear. Most of the sample (84%) had nightmare. The children having fear of animals were 70%. Totally, 66% of the sample were punished for bedwetting. Most of them, ie 96% of the sample were felt that self-esteem was affected by bedwetting. Totally, 83% of them were feel bad about bedwetting habit.

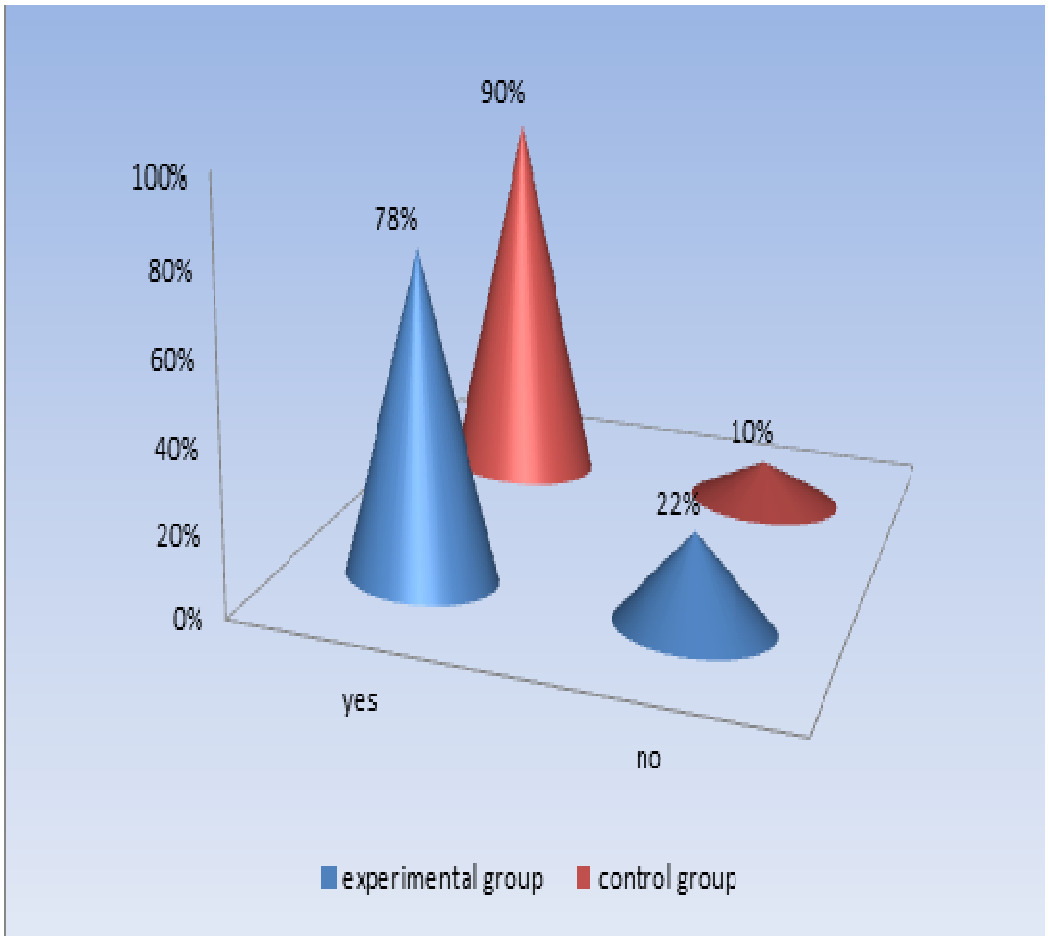

Fig-5:- Distribution of children having nightmare.

SECTION II

Table-4

Prevalence of Nocturnal enuresis among children in both villages.

N=356

Prevalence	Experimental (karungalakudi) n = 257		Control (Pettai) n = 99		Total N = 356	
	f	**%**	**f**	**%**	**F**	**%**
Present	110	42.8	60	60.6	170	47.75
Absent	146	57.03	39	39.39	185	51.96

Table-4 shows the prevalence of Nocturnal enuresis. It was 42.8% in experimental and 60.6% in control group. The overall prevalence of nocturnal enuresis was 47.7

SECTION III

Table-5

Distribution of children in experimental group according to pretest and post test level of nocturnal enuresis.

n=50

Level of Nocturnal enuresis	Experimental Group n=50			
	Pre test		Post test	
	F	%	F	%
Mild	13	26	50	100
Moderate	36	72	-	-
Severe	1	2	-	-

Table 5 depicts that, in pre test 36 children (72%) were in moderate level of nocturnal enuresis. Whereas in post test 50 children (100%) were in mild level of nocturnal enuresis.

Table-6

Distribution of children in experimental group according to the pre test and post test level of nocturnal enuretic symptoms.

n=50

Nocturnal enuresis symptoms		Experimental Group							
		Nil		Occasionally 1-3 times/month		Frequently 4-6 times/month		Always Everyday	
		F	%	F	%	f	%	f	%
Frequency of Nocturnal Enuresis	Pre test	1	2	12	24	23	46	14	28
	Post test	26	52	24	58	-	-	-	-
Sleep interrupted with bedwetting	Pre test	22	44	15	30	10	20	3	6
	Post test	37	74	13	26	-	-	-	-
Wake but avoid going to toilet	Pre test	23	46	14	28	12	24	1	2
	Post test	44	88	6	12	-	-	-	-
Drinking water frequently in the evening hours	Pre test	4	8	31	62	9	18	6	12
	Post test	47	94	3	6	-	-	-	-
Complaints of constipation	Pre test	11	22	20	40	15	30	4	8
	Post test	39	78	11	22	-	-	-	-

With regard to frequency of nocturnal enuresis, 23 (46%) of them had frequent bedwetting (4-6 times/month) in pre test. In contrast, 24 (58%) of them had occasional bed wetting (1-3 times/month) in post test. Regarding complaints of constipation, 20(40%) of had constipation occasionally, but 39 (78%) of them did not have constipation after the intervention.

Table-7

Distribution of children in control group according to the pre test and post test level of nocturnal enuresis.

n=50

Level of nocturnal enuresis	Control Group			
	Pre test		Post test	
	F	%	F	%
Mild	20	40	18	36
Moderate	29	58	32	64
Severe	-	-	-	-

On the total of subjects in control group, more than half of the children are in moderate level of nocturnal enuresis and there is no significance difference between pre test and post test.

Table-8

Distribution of children in control group according to the pre test and post test level of nocturnal enuretic symptoms. n=50

Symptoms of Nocturnal Enuresis		Control Group							
		Nil		Occasionally 1-3 times/month		Frequently 4-6 times/month		Always Every Day	
		F	%	f	%	f	%	f	%
Frequency of Nocturnal Enuresis	Pre test	4	8	23	46	13	26	10	20
	Post test	5	10	20	40	15	30	10	20
Sleep interrupted with bedwetting	Pre test	6	12	29	58	15	30	-	-
	Post test	7	14	26	52	17	34	-	-
Wake but avoid going to toilet	Pre test	2	4	29	58	19	38	-	-
	Post test	2	4	28	56	20	40	-	-
Drinking water frequently in the evening hours	Pre test	11	22	27	54	12	24	-	-
	Post test	10	20	28	56	12	24	-	-
Complaints of constipation	Pre test	22	44	26	52	2	4	-	-
	Post test	20	40	25	50	5	10	-	-

Regard to frequency of nocturnal enuresis, more than one fifth of them had occasionally (1-3 times/ month) in both pre test (46%) and post test (40%) score of control group.

SECTION IV: Effectiveness of behavioural modification therapy

Table-9

Comparison of post test level of nocturnal enuresis between experiment and control group.

Group	Level of nocturnal enuresis reduction					
	Mild		Moderate		Severe	
	F	%	F	%	F	%
Experimental Group	50	100	-	-	-	-
Control Group	18	36	32	64	-	-

Table -9 depicts that, in post test, in all the 50 subjects (100%) there was significant reduction in nocturnal enuresis level of experimental group. Whereas control group none of them had reduction in nocturnal enuresis level.

Table-10

Comparison of mean pre test & post test of Nocturnal enuretic score of experimental group.

Nocturnal enuretic score	N	Mean	Mean difference	SD	't' value	df
Pre test	50	6.28	5.14	1.513	24.13*	49
Post test	50	1.14		0.921		

***significance at (p<0.05) level.**

To compare the mean pretest & post test nocturnal enuretic score of children, the null hypothesis stated was as follows: H_{01} – the mean post test Enuretic pattern score of child in experimental group who had behavioral modification therapy will be significantly lower than their pretest score.

The hypothesis was tested using paired t-test.

Table-10 portrays that the mean post nocturnal enuretic score of 1.14 was lower than the mean pretest nocturnal enuretic score 6.28. The obtained 't' value 24.13 was statistically highly significant at P>0.05 (df-49) level. This illustrates the mean difference of 5.14 was a true difference and has not occurred by chance. So the researcher rejects the null hypothesis and accepts the research hypothesis.

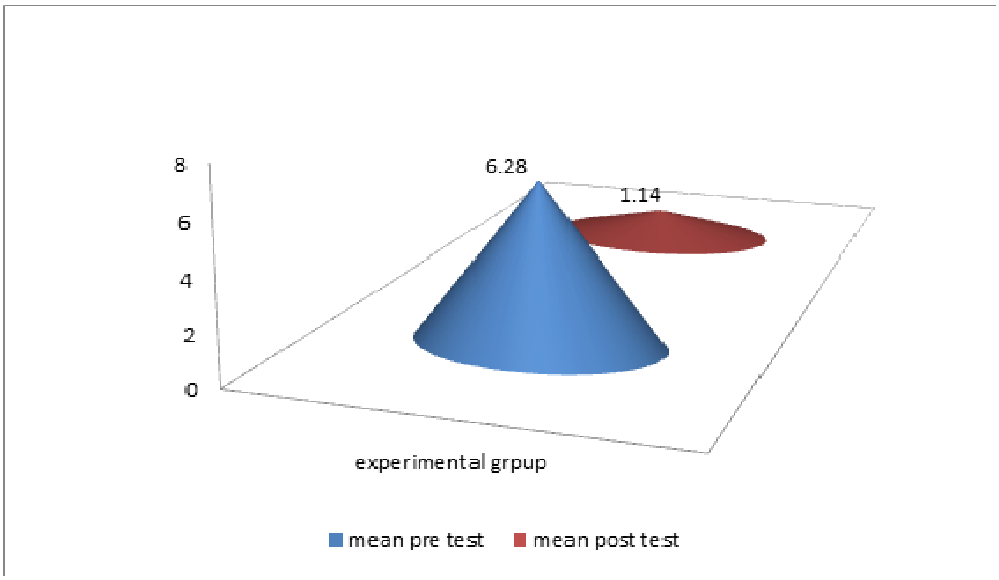

Fig-6:- Comparison of mean pre test and post test of nocturnal enuretic score of experimental group.

Table-11

Comparison of mean post-test score of nocturnal enuresis between experimental and control group.

n= 50

Nocturnal enuretic score	N	Mean	Mean difference	SD	't' value	df
Experimental Group	50	1.14	4.76	0.916	18.120*	98
Control Group	50	5.9		1.615		

***significance at the (p<0.05) level**

The null hypothesis stated was as follows:

H02 – the mean post test nocturnal enuretic score of the experimental group will not be significantly lower than the mean post score of control group.

The hypothesis was tested using Independent 't' test.

Table 13 shows that the mean post test nocturnal enuretic score 1.14 of experimental group was lower than the mean post test nocturnal enuretic score 5.9 of control group. The obtained 't' value 18.12 at df 49 was statistically highly significant at 0.05 level. This illustrates that the mean difference of 4.76 was a true difference. So the researcher rejects the null hypothesis and accepts the research hypothesis.

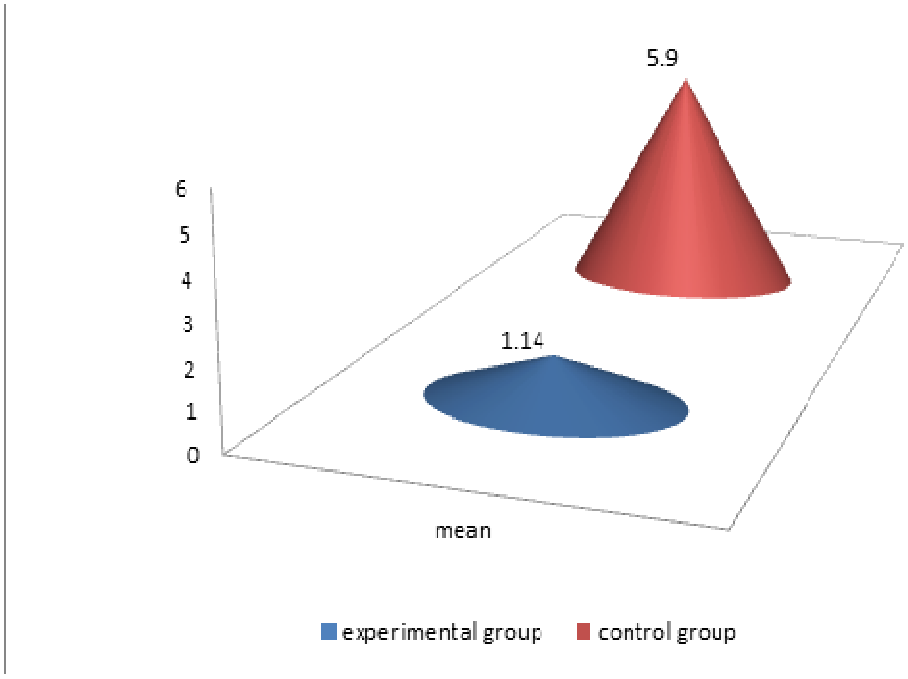

Fig-7 :- Comparison of mean post test score of nocturnal enuresis between experimental and control group.

SECTION V:

Table-12

Association between pre-test nocturnal enuretic score & selected demographic variables of experimental group. n=50

Demographic variables	Below mean	Above mean	Total	$\chi 2$	df
Age					
5-6	2	18	20		
7-8	7	12	19	0.631#	2
9-10	4	7	11		
Sex					
Male	3	15	18	0.225#	1
Female	10	22	32		
Education of mother					
Illiterate	4	17	21	0.170#	1
Literate	9	20	29		
Education of the father					
Illiterate	4	17	21	0.090#	1
Literate	3	26	29		
Occupation of the mother					
Employed	5	10	15	0.157#	1
Unemployed	7	28	35		
No of siblings					
1	7	13	20		
>1	2	5	7	0.158#	2
Nil	4	19	23		

Table 12 to be Contd..

History of enuresis in parents					
Yes	1	3	4		
No	4	13	17	0.05466#	2
Don't know	9	20	29		
Night mare					
Yes	11	28	39	0.059#	1
No	2	9	11		
Fear of animal					
Yes	9	24	33	0.014#	1
No	4	13	17		
Punishment for Enuretic behavior					
Yes	8	26	34	0.056#	1
No	5	11	16		
Time of voiding at night					
Midnight	10	33	43	0.111#	1
Early morning	3	4	7		
Self-esteem is affected by bedwetting habit					
Yes , if yes	5	13	18		
1) Cry					
2) Guilty	2	9	11	0.2529#	3
3) Afraid	5	13	18		
No	2	1	3		
Going to school is frightening					
Yes	1	2	3	0.0038#	2
No	12	35	47		

Table 12 to be Contd..

Comfortable school toilet					
Yes	9	32	41	0.0003#	1
No	2	7	9		
Problem in studying					
Yes	1	9	10	0.1568#	1
No	11	29	40		
Punish/scold by teacher in front of others					
No	2	9	11	0.18589#	2
Occasionally	8	16	24		
Frequently	3	12	15		
Fight with friends in school					
No	1	6	7	0.09546#	2
Occasionally	8	18	26		
Frequently	4	13	17		

In significant at 0.05 level of significance

To find out the association between the mean pre test nocturnal enuretic score and selected demographic variables such as age, sex, education of the mother, occupation of the mother, no of siblings, night mare, fear of animals, punishment for Enuretic behaviour, time of voiding at night, the null hypothesis was stated as follows.

H_{03} – there will not be any significant association between the nocturnal enuretic score and demographic variables. From the above table-14, It is inferred that there was no significant association between nocturnal enuretic score and demographic variables. So the researcher accepts the null hypothesis and reject research hypothesis.

Table – 13

Association between pre-test nocturnal enuretic score in experimental group and selected clinical profile. n=50

Demographic variables	Below mean	Above mean	Total	$\chi 2$	df
History of enuresis in parents					
Yes	1	3	4		
No	4	13	17	0.05466#	2
Don't know	9	20	29		
Night mare					
Yes	11	28	39	0.059#	1
No	2	9	11		
Fear of animal					
Yes	9	24	33	0.014#	1
No	4	13	17		
Punishment for Enuretic behaviour					
Yes	8	26	34	0.056#	1
No	5	11	16		
Time of voiding at night					
Midnight	10	33	43	0.111#	1
Early morning	3	4	7		
Self-esteem is affected by bedwetting habit					
If yes	5	13	18		
1) Cry					
2) Guilty	2	9	11	0.2529#	3
3) Afraid	5	13	18		
No	2	1	3		

In significant at 0.05 level of significance

To find out the association between the mean pre test nocturnal enuretic score and selected clinical profile such as, history of enuresis in parents, night mare, fear of animals, punishment for Enuretic behavior, time of voiding at night, self esteem is affected by bed wetting habit, the null hypothesis was stated as follows.

H_{03} – there will not be any significant association between the nocturnal enuretic score and clinical profile. From the above table-13, It is inferred that there was no significant association between nocturnal enuretic score and clinical profile. So the researcher accepts the null hypothesis and reject research hypothesis.

Table - 14

Association between pre-test nocturnal enuretic score in experimental group and selected contributing of nocturnal enuresis n=50

Demographic variables	Below mean	Above mean	Total	$\chi 2$	df
Going to school is frightening					
Yes	1	2	3	0.0038#	2
No	12	35	47		
Comfortable school toilet					
Yes	9	32	41	0.0003#	1
No	2	7	9		
Problem in studying					
Yes	1	9	10	0.1568#	1
No	11	29	40		
Punished/scolded by teacher in front of others					
No	2	9	11	0.18589#	2
Occasionally	8	16	24		
Frequently	3	12	15		
Fight with friends in school					
No	1	6	7	0.09546#	2
Occasionally	8	18	26		
Frequently	4	13	17		

In significant at 0.05 level of significance

To find out the association between the mean pre test nocturnal enuretic score and selected contributing factors related to nocturnal enuresis such as, going to school is frightening, comfortable school toilets, problem is studying, punished/ scolded in front of others by teacher, fight with friends in school the null hypothesis was stated as follows.

H_{03} – there will not be any significant association between the nocturnal enuretic score and contributing factors related to nocturnal enuresis. From the above table-16, It is inferred that there was no significant association between nocturnal enuretic score and contributing factors related to nocturnal enuresis. So the researcher accepts the null hypothesis and reject research hypothesis.

CHAPTER – V

DISCUSSION

This study was conducted to assess the prevalence of nocturnal enuresis and evaluate the effectiveness of behavioural modification therapy on nocturnal Enuresis among children between 5-10 years in selected rural areas. The findings are discussed in this chapter with reference to the objectives stated in chapter I.

Demographic Characteristics of the Samples:

Table-1 shows that, 40% of children in both the groups belonged to 5-10 years of age. More than one third of children (63%) in both groups were of females. Similarly, Gunes, Acik and Akilli (2009) conducted a cross sectional study regarding the epidemiology and factors associated with nocturnal enuresis among daytime school children in Turkey, it revealed that, the prevalence was slightly higher in girls (16.8%) than boys (14.3%). In contrast, Eapen et al., (2003) mentioned that in a study at UAE, more boys were affected (12%) than girls (9%), and 90% of those with enuresis were aged 6 -11 years.

In experimental group nearly half ie, 25(50%) and 33 (66%) in control group were the first child with regard to order of birth. Care taker of the total sample indicated an overwhelming majority (96%) of them being cared by mother. Regarding number of siblings, nearly one third (36%) in both the groups had one sibling. Of the total sample, 45% earned more than Rs.5000 per month, nearly one fourth of them earned below Rs.5000 per month. Educational level of father depicted that, nearly one third (34%) of the sample in both the groups were illiterate. Among the total sample, less than 40% of their mother’s had completed primary education; less than one third

of the subject's mother were illiterates. In total sample, most of their mother's were housewives, more than one fifth (22%) of the mother were doing unskilled work. Regarding occupation of the father, nearly more than half (60%) of their father's were doing unskilled work. Majority (99%) of the sample's parents were living together. There is no congruent literature found with relation to this study findings.

Clinical profile of the sample:

Table-2 depicts that, previous history of enuresis in parents, half of them (50%) did not know if they had. Of the total sample overwhelming majority ie 88% had past history of enuresis in siblings. A positive family history of enuresis was reported in 23 (72%) cases, of which half (12 cases) gave history of enuresis on both the maternal and paternal sides of the family. (Eapen et al, UAE, 2003)**.** Majority of the sample 99% had no history of UTI. With regard to behaviour modification therapy, 96% of them had not tried any therapies, only 4% of them tried occasionally. All children who participated in present study had no history of surgery in genital area. An overwhelming majority (99%) of them had no pain during voiding; and 97% of them had no day time incontinence and daytime urgency. Of the total sample, 95% of them had started toilet training when they were less than three years of age. Regarding habit of bedwetting, 99% of the subjects had for more than six months period. Most of them (77%) had bedwetting at midnight and 23% of them had at early morning. All children who participated in the present study had consulted with physician for bedwetting There is no congruent literature found with relation to this study findings.

Contributing factors related to nocturnal enuresis:

Table-3 portrays that, 53% of the sample were punished/scolded occasionally, 22% of them were punished frequently. Nearly, half of the sample were fighting occasionally with friends in school. Most of the sample (84%) had nightmare. The children having fear of animals were 70%, totally, 66% of the sample were punished for bedwetting. Most of them, ie 96% of the sample felt that self-esteem was affected by bedwetting. Taha & sabra (2011) conducted a retrospective study of nocturnal enuresis at a primary care setting in Saudi Arabia and found that, 72 (61.5%) children were punished for bedwetting, 40% had fear which is higher than the present study.

The prevalence of nocturnal enuresis among children in the control group and experimental group.

Table-4 Presents the prevalence of nocturnal enuresis among children in both village Karungalakudi and Pettai. Prevalence of nocturnal Enuresis was 42.8% in Karungalakudi and 60.6% in Pettai. The overall prevalence was 47.75%. This finding is higher than the prevalence reported in other studies by the following researchers. Similarly, a retrospective study conducted by Taha to evaluate the social and personal characteristics and associated factors of nocturnal enuresis in Saudi Arabia (2009) revealed that 90.6% were primary nocturnal enuresis and 9.4% were secondary nocturnal enuresis in that 65% children were 7-13 years.

A cross sectional epidemiological study was performed among primary school children living in Ankara, Turkey by Ozden (2007). The overall prevalence of nocturnal enuresis were 17.5% (n = 234).

To assess the pre test and post test level of nocturnal enuresis among Children in experimental group:

Table-5 depicts that, in pretest level of nocturnal enuresis, 13 children (26%) were in mild and 36 children (72%) were in moderate and 1 child (2%) had severe Nocturnal enuresis. Whereas in post-test level of nocturnal enuresis, 37 children (74%) in the experimental group had reduction to mild level i.e none was found with moderate/severe form of nocturnal enuresis due to the intervention. The interventions are lifting, waking, stop-start training, good bladder health recommendations, treatment of nocturnal polyuria, retention control training and reinforcement therapy.

Table-6 reveals the symptom wise description as per that, 23 (46%) of them had frequent bedwetting (4-6 times/month) in pre test. In contrast, 24 (58%) of them had occasional bed wetting (1-3 times/month) in post test. With respect to sleep interrupted bed wetting, wake but avoid going to toilet and drinking water frequently in evening hours, 10(20%), 12(24%) and 9(18%) had frequently in pre test whereas, 34(74%), 44(88%) and 47(94%) did not had and 13(26%), 6(12%) and 3 (6%) had occasionally in post test. Regarding complaints of constipation, 20(40%) of had constipation occasionally, but 39 (78%) of them did not have constipation after the intervention.

A similar study was conducted by Mokillop A. et al (2001) on health educational program for reducing Nocturnal enuresis behaviour in News Zealand; the outcomes of this study indicated that the change occurs after the intervention (educational program) and there was a large difference between pre-test (78%) and post-test (45%), these outcomes point to successful application of the educational program to improve the parent’s knowledge through application of educational

program frequency. Similarly, a study done by Fockema (2005) on treatment modalities chosen by parents of children with Nocturnal enuresis showed that 7.9% succeeded with star chart, 29.5% succeeded in waking the child at night and 25.5% succeeded in restricting fluid intake at night.

To assess the pre-test and post-test level of Nocturnal enuresis among children in control group.

Table-7 portrays that, among the total subjects in control group, more than half of the children were in moderate level of nocturnal enuresis in the pre test as well as in the post test. Table-8 shows the symptom wise description, more than one fifth of them had nocturnal enuresis occasionally (1-3 times/ month) in both pre test (46%) and post test (40%) score of control group.

The effectiveness of behavioural modification therapy on nocturnal enuresis among children.

Table -9 depicts that, in post test among all the subjects (100%) there was significant reduction from moderate to mild in nocturnal enuresis level of experimental group. Whereas control group none of them had reduction in nocturnal enuresis level.

Table-10 portrays that the mean post nocturnal enuretic score of 1.14 was lower than the mean pretest nocturnal enuretic score 6.28 in experimental group. The obtained ‘t’ value 24.13 was statistically highly significant at P>0.05 (df-49) levels. This illustrates the mean difference of 5.14 was a true difference and has not occurred by chance. So the researcher rejects the null hypothesis and accepts the research hypothesis.

Table-11 portrays that, effectiveness of behaviour modification therapy on nocturnal enuresis among children, the investigator used Nocturnal enuresis rating scale. There was a significant difference in Nocturnal enuretic score (t-18.12, DF-98, at $p<0.05$ level) between the experimental and control groups. As per Table-11 the mean post test nocturnal enuretic score (5.9) of control group was higher than the mean post test nocturnal enuretic score (1.14) of experimental groups. From the mean difference of (4.76) it is evident that the behaviour modification therapy was found to be effective in the experimental group only.

In conclusion on the whole, behaviour modification therapies are found to be effective in treating nocturnal enuresis and without significant side effects. Through this study, the investigator has made attempt to highlight the effectiveness of behaviour modification therapy for treating nocturnal enuresis.

To find out the association between pre test nocturnal Enuretic score and socio demographic variables.

Table – 12 depicts that, An analysis on whether the variable in the study exerts any influence in the nocturnal enuretic score was done. In this the researcher found that, there was no association between the pre and post test nocturnal enuresis level and selected demographic variables such as, age, sex, educational status of mother, occupation of mother, number of siblings, birth order of the child, nightmare, fear of animal, punishment for nocturnal enuresis and time of bet wetting.

Since there was no significant association found between nocturnal enuretic score and demographic variables, the researcher accepts the null hypothesis and rejects the research hypothesis.

To find out the association between pre test nocturnal Enuretic score and clinical profiles.

Table – 13 showed that, An analysis on whether the variable in the study exerts any influence in the nocturnal enuretic score was done. In this the researcher found that, there was no association between the pre and post test nocturnal enuresis level and selected clinical profile such as, history of enuresis in parents, night mare, fear of animals, punishment for Enuretic behaviour, time of voiding at night, self esteem is affected by bed wetting habit. Since there was no significant association found between nocturnal enuretic score and clinical profile, the researcher accepts the null hypothesis and rejects the research hypothesis. A similar study which studied (Gunes, Acik and Akilli, 2009) regarding the epidemiology and factors associated with nocturnal enuresis among day time school children in Turkey, showed that low income (OR-2.86) was associated with nocturnal enuresis.

To find out the association between pre test nocturnal Enuretic score and contributing factors related to nocturnal enuresis.

Table – 14 portrays that, An analysis on whether the variable in the study exerts any influence in the nocturnal enuretic score was done. In this the researcher found that, there was no association between the pre and post test nocturnal enuresis level and selected clinical profile such as, going to school is frightening, comfortable school toilets, problem is studying, punished/ scolded in front of others by teacher, fight with friends in school. Since there was no significant association found between nocturnal enuretic score and clinical profile, So the researcher accepts the null hypothesis and reject's research hypothesis. A similar study revealed that (Gunes, Acik and Akilli, 2009) regarding the epidemiology and factors associated with

nocturnal enuresis among day time school children in Turkey, that family history of enuresis (OR-3.64) were associated with nocturnal enuresis. Eapen et al., (2003) conducted a study at UAE Presence of enuresis was found to be associated with psychosocial stress in the family; large family size; a positive family history, presence of psychiatric disturbance as indicated by the Rutter parent score.

The above findings illustrate that the problem of nocturnal enuresis was not influenced by any contributory factors cited in the literature. So it can be concluded that the behaviour modification therapy could be used as tool to bring down the problem of enuresis and of their influencing variables need to be identified.

CHAPTER – VI

SUMMARY, CONCLUSION, IMPLICATIONS AND RECOMMENDATIONS

This chapter deals with the summary, conclusions, implication and also recommendation for different areas like nursing practice, nursing education, nursing administration and nursing research.

SUMMARY

Health of the children has been considered as vital important to all societies because children are the basic resource for the future of human kind. This intended the researcher to study the effectiveness of behavioral modification therapy on nocturnal enuresis among children between 5 to 10 years in selected rural areas in Madurai. The following objectives were set for the study.

1. To identify the prevalence of children with nocturnal enuresis.
2. To assess the pre test and post test level of nocturnal enuresis among children in both experimental and control group.
3. To evaluate the effectiveness of behavioral modification therapy among children.
4. To find out association between the pre test nocturnal enuretic score children in Experimental group with demographic variables, clinical profile and contributing factors related to Nocturnal Enuresis

   The following hypothesis were set for the study. All hypothesis were tested as 0.05 level of significance.

5. The mean post test nocturnal enuretic score will be significantly lower than the pre test nocturnal enuretic score of the experimental group.
6. The mean post test nocturnal enuretic score of the experimental group will be significantly lower than the mean post test nocturnal enuretic score of the control group.
7. There will be a significant association between the pre test nocturnal enuretic score among children and their selected demographic variables.
8. There will be a significant association between the pre test nocturnal enuretic score among children and their selected clinical profile.
9. There will be a significant association between the pre test nocturnal enuretic score among children and their selected contributing factors related to nocturnal enuresis.

The conceptual framework of this study was based upon on J.W.Kenny's open system model.

Dependent variable was Nocturnal enuresis and Independent variable was behavior modification therapy.

A true experimental pre test – post test control group design was chosen for conducting the study. The population chosen for this study were, the available children in the age of 5-10 years who were screened for nocturnal enuresis.

The tool used for data collection consisted of two parts.

Part I

- Demographic variables
- Clinical profile
- Contributing factors related to nocturnal enuresis

Part II – Nocturnal enuretic rating scale

A pilot study was conducted to assess the feasibility of the study. Main study was conducted with 100 samples (50 in experimental group and 50 in control group) for a period of five weeks. The data were analyzed using descriptive statistics (percentage, mean, and standard deviation) and inferential statistics (chi-square, Paired 't' test and independent 't' test) were used to analyze the data and to test the hypothesis.

THE MAJOR FINDINGS OF THE STUDY

a). Demographic data of sample:

1. With regard to age, 40% of children in both the groups belonged to 5-10 years of age.
2. More than one third of children (63%) in both groups were of females.
3. In experimental group nearly half that is, 25(50%) and 33 (66%) in control group were the first child with regard to order of birth.
4. Care taker of the total sample indicated an overwhelming majority (96%) of them being cared by mother.
5. Regarding number of siblings, nearly half of the sample (50%) had one sibling.

6. Of the total sample, 45% of them earned more than Rs.5000 per month, nearly one fourth of them earned below Rs.5000 per month.
7. Educational level of father depicted, nearly one third (40%) of the sample completed up to primary education, whereas 34% of the sample were illiterate.
8. Among the total sample, less than 40% of the mother were completed primary education, less than one third of the subject's mother were illiterate.
9. In total sample, most of the mother were housewife, more than one fifth (22%) of the mother were doing unskilled work.
10. Regarding occupation of the father, nearly more than half (60%) of the father were doing unskilled work.
11. Majority (99%) of the sample's parents were living together.

b) Prevalence of nocturnal enuresis

A total of 257 children from 5-10 years of age were screened from karungalakudi and Pettai. The prevalence of nocturnal Enuresis among children living in karungalakudi was 42.8% and in Pettai was 60.6%. The overall prevalence of nocturnal enuresis was 47.75%. Which suggests that even, in rural population half of the children in this age group are found to be nocturnal enuresis.

c) Effect of behavior modification therapy:

The children who participated in the study have no previous exposure to Nocturnal enuretic treatment modalities, 36 children (72%) were found in moderate level of nocturnal enuresis with pre test, Whereas in post test 50 children (100%) were in mild level of nocturnal enuresis. There was none found moderate & severe level of

nocturnal enuresis with the post test among children in experimental group where as in control group 64% of them in moderate level of nocturnal enuresis in the post test.

In experimental group, the mean post test nocturnal enuretic score of 1.14 was lower than the mean pretest nocturnal enuretic score 6.28. ($p<0.05$ level of significance, df-49, t- 24.13*). The mean post test nocturnal enuretic score 1.14 of experimental group was lower than the mean post test nocturnal enuretic score 5.9 of control group($p< 0.05$ level of significance , df- 98, t- 8.12*).

d) Association between pre test score of Nocturnal enuretic score and demographic variables, clinical profile and contributing factors related to nocturnal enuresis.

There is no significant association between the pre test nocturnal enuretic score among children and their selected demographic variables and their contributory factors.

CONCLUSIONS

The following conclusions are drawn from the study.

Nocturnal enuresis is more prevalent in rural areas, this study proved that behavioural modification therapy is effective. Hence it is cost effective, simple and much applicable in rural children. primary health care nurses should screen routinely for nocturnal enuresis. Health education of parents by the PHC team is needed to asvise against punishment of the Nocturnal enuretic child and explain the various modalities of treatment. Enuresis is a pediatric public health problem and efforts at all levels should be made such as preventive, etiological and curative.

LIMITATIONS

This study is limited to,

1. Children with in the age group from 5-10 years
2. Who are willing to participate in the study
3. Prevalence of nocturnal Enuresis was checked only for children available in the area.
4. Children were screened for presence of nocturnal enuresis by interview method only.
5. No observation were made with regard to the change in the Nocturnal enuretic pattern.
6. Other variables influencing Nocturnal enuresis need to be tested.

IMPLICATIONS FOR NURSING

Nursing Practice:

- Nursing personnel are in the best position to impart knowledge on the effectiveness of behavioural modification therapy to the rural mothers.
- Nurses must routinely screen the children for Nocturnal enuresis during school health and impact awareness to school teacher also.
- The study helps the nurse practitioners to independently give behavioural modification therapy to treat nocturnal enuresis than other treatment modalities in the management of children with Nocturnal Enuresis.
- Mothers can be taught about this behaviour modification therapy in their homes which they can be practiced easily without much expense and effort.

Nursing Education:

- Nurse educators can also empower nursing students with adequate skills and knowledge on behavioural modification therapy.
- Behavioural modification therapies can be integrated in the curriculum of nursing, so that all the nursing students will be prepared to help the children.

Nursing Research:

- This study also brings about the fact that more studies are needed to be done in different settings using different behavioural modification therapy to deal with the health problems of children.
- This intervention will promote Evidence based practice.
- Nurses who conduct clinical trials must disseminate the knowledge to other health team members and further validate the findings.

Nursing Administration:

- The nurse administrators shall organize behaviour modification therapy training in the Nurses and mothers.
- Nurse administrators should provide resources for nurses to carryout such therapies.
- Effectiveness of various Nurse oriented interventions are to be evaluated by administrators to provide Quality care.

RECOMMENDATIONS

On the basis of the present study the following recommendations have been made for further studies.

- Similar study can be conducted for a larger group for a longer period.
- Similar study can be conducted to adolescents.
- This study can be done as a comparative study between rural and urban children.
- A follow up study can be done to find out whether the children are doing behavioural modification therapy regularly and its effect on nocturnal enuresis and impact on quality of life.
- Correlative study can be undertaken to identify factors related to Nocturnal enuresis.
- Efficacy of various other interventions can be used to change the Nocturnal enuretic pattern.

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APPENDIX – I

COPY OF LETTER SEEKING EXPERTS OPINION FOR TOOL AND CONTENT VALIDITY

From,

_____

II year M.Sc., Nursing,

Sacred heart Nursing Collage

Ultra Trust, Madurai – 20.

To,

Respected Madam/Sir,

Sub: Requesting opinion and suggestion of experts for the tool for its validity

I am _____II year Master Degree Nursing student in Sacred heart Nursing Collage. In partial fulfilment of Master Degree in Nursing. I have selected the topic mentioned below for the research project to be submitted to the Dr. M.G.R University, Chennai.

Problem statement:

A study to assess the effectiveness of behavior modification therapy on Nocturnal enuresis among children in selected rural areas in Madurai.

Hence I request you to kindly examine the tool, content and give your valuable opinion and suggestion for improvement of tool and content.

Enclosure :

- Problem statement
- Demographic profile
- Clinical profile
- Contributing factors related to Nocturnal enuresis
- Tool
- Intervention package

Thanking you,

Place: Yours sincerely,

Date: _____

APPENDIX – II

COPY OF LETTER SEEKING PERMISSION FROM THE DDHS TO CONDUCT THE STUDY

To

The Deputy Director of Health services,
Viswanathapuram,
Madurai.

Respected Sir/Madam,

Sub: Sacred Heart Nursing Collage, Madurai – project work of M.Sc ., (N) student – permission requested – reg

We wish to state that final year M.Sc., (N) student of our collage has to conduct a research project, which is to be submitted to the Tamilnadu Dr. M.G.R Medical University, Chennai in partial fulfilment of University requirements.

The topic of research project is 'A study to assess the efficacy of behavior modification therapy on Nocturnal Enuresis among children in selected rural areas of Madurai'.

We therefore request you to kindly permit her to do the research work under your valuable guidance and suggestions.

Thanking you,

Yours faithfully,
Principal,
SACRED HEART NURSING COLLAGE
ULTRA TRUST, MADURAI – 20.

APPENDIX – III

List of Experts Consulted for the content validity of Research Tool

Dr. Joy Patricia Pushparani, M.D (community medicine)
Associate professor,
Institute of Community Medicine,
Coimbatore Medical Collage,
Coimbatore.

Dr. M. Balasubramanian, M.D (paediatric medicine)
Associate professor,
ICU ARC,
Government Rajaji Hospital,
Madurai- 20.

Dr. C.S. Sowndaram, M.Phil , Ph.D,(Psychology)
Professional counsellor,
Amrita University,
Coimbatore.

Dr. Nalini Jeyavanth Santha, M.Sc (N), Ph.D.(paediatric health nursing)
Principal,
Sacred heart nursing collage,
Madurai-20.

Prof. (Mrs) Devakirubai, M.Sc (N), Ph.D. (medical surgical nursing)
Professor,
Sacred heart nursing collage,
Madurai- 20.

APPENDIX – IV

PART – I

Socio - Demographic variables

1 Name of the child **Study no:**

2 Age of the child

a) 5-6 ☐

b) 7-8 ☐

c) 9-10 ☐

3 Sex of the child

a) Male ☐

b) Female ☐

4 Birth order of the child

a) 1 ☐

b) 2 ☐

c) 3 ☐

d) >3 ☐

5 No of siblings

a) 1 ☐

b) 2 ☐

c) >2 ☐

d) Nil ☐

6 Caretaker

a)Mother ☐

b) Father ☐

c) Others ☐

7 Income of the family (in rupees)

a) <2500 ☐

b) 2501-5000 ☐

c) >5000 ☐

8 Education level of father

a) Illiterate ☐

b) Primary ☐

c) Secondary ☐

d) Higher secondary ☐

e) Graduate ☐

9 Education level of mother

a) Illiterate ☐

b) Primary ☐

c) Secondary ☐

d) Higher secondary ☐

e) Graduate ☐

10 Occupation of the mother

a) Skilled ☐

b) Semiskilled ☐

c) Unskilled ☐

d) Unemployed ☐

11 Occupation of the father

a) Professional ☐

b) Skilled ☐

c) Semiskilled ☐

d) Unskilled ☐

e) Unemployed ☐

12 Both parents are living together

a) Yes ☐

b) No ,if no ☐

1) Death

2) Separated ☐

Clinical Profile

1 **Previous history of enuresis in parents**

a) Yes ☐

b) No ☐

c) Don't know ☐

2 **Past history of enuresis in sibling**

a) Yes ☐

b) No ☐

c) Don't know ☐

3 **History of UTI**

a) Yes ☐

b) No ☐

4 **History of surgery in genital area**

a) Yes ☐

b) No ☐

5 **Pain during voiding**

a) Yes ☐

b) No ☐

6 **Daytime incontinence**

a) Yes ☐

b) No ☐

7 **Daytime urgency**

a) Yes ☐

b) No ☐

8 **Toilet training started at the age of**

a) <3 years ☐

b) >3 years ☐

9 **Habit of bedwetting**

a) <6 months ☐

b) >6 months ☐

10 **Bedwetting time at night**

a) 2 hours after asleep ☐

b) Midnight ☐

c) Early morning ☐

11 **Consulted with physician for bedwetting.**

a) Yes ☐

b) No ☐

12 **Have you tried any behaviour modification therapy for nocturnal enuresis**

a) Yes , if yes ☐

1) Regularly

2) Occasionally ☐

b) No ☐

Contributing factors related to nocturnal enuresis

Factors related to school

1 **Problem in studying**

a) Yes ☐

b) No ☐

2 **Going to school is frightening**

a) Yes ☐

b) No ☐

3 **Teacher has punished/scolded in front of others**

a) No ☐

b) Occasionally ☐

c) Frequently ☐

d) Always ☐

4 **Fighting with friends in school**

a) No ☐

b) Occasionally ☐

c) Frequently ☐

d) Always ☐

5 **Comfortable with school toilets**

a) Yes ☐

b) No ☐

6 **Avoid using toilet at school**

a) Yes ☐

b) No ☐

Factors related to home

7 **Frightening situation in family**

a) Yes ☐

b) No ☐

8 **Being compelled for academic achievement**

a) Yes ☐

b) No ☐

9 **Fear of toilet**

a) Yes ☐

b) No ☐

10 **Child having nightmare**

a) Yes ☐

b) No ☐

11 **Fear of animals**

A) Yes ☐

b) No ☐

12 **Having punished the child for bedwetting**

a) Yes ☐

b) No ☐

13 **Self-esteem is affected by bedwetting habit**

a) yes, if yes ☐

1. cry
2. guilty ☐
3. afraid ☐
4. avoid outstaying ☐

b) No ☐

14 **Feel bad about habit of bedwetting**

a) Yes ☐

b) No ☐

APPENDIX – IV.a

PART – II

S. No	Nocturnal enuretic rating scale				
		Nil	**Occasionally**	**Frequently**	**Always**
1	Frequency of Nocturnal Enuresis	**1-2 times/month**	**1-3 times/month**	**4-6 times/month**	**Everyday**
2	Sleep interrupted with bedwetting				
3	Wake but avoid going to toilet				
4	Drinking water frequently in the evening hours				
5	Complaints of constipation				

Interpretation:

Mild – 0-5

Moderate – 6-10

Severe – 11-15

APPENDIX – V

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b) >3

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a) <6 ☐

b) >6 ☐

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APPENDIX – V.a

- II

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- 0-5
- 6-10
- 11-15

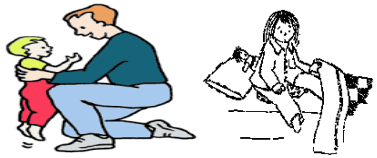
APPENDIX – VI

BEHAVIOR MODIFICATION THERAPY

Title	Intervention
Lifting	• Taking the child to the toilet during the night usually before the time that Bedwetting is expected, without necessarily waking the child.
Waking	• Waking the child to allow him/her to get up and urinate.
Stop-start training	• Teaching children to interrupt their stream of urine in order to strengthen their pelvic floor muscles
Good bladder health recommendation	• Children should be counselled to void regularly enough to avoid urgency and urgency incontinence.
Treatment of nocturnal polyuria	• A liberal water intake during the day, especially during the morning and early afternoon hours at school, is recommended.

Retention control training	• The goal of therapy is good bowel health, which might be defined as a soft movement, with a diameter less than 2 or 3 cm, passed without discomfort every morning after breakfast and before the child leaves for school. Encouraging a movement before the child leaves for school prevents withholding during school hours. The need to drink a liberal amount of water, to avoid foods known to cause hard stool, and to choose foods that soften the stool, should be discussed.
Reinforcement therapy	• Reward system should serve as a positive reinforcement to the child for achieving dry nights. The rewards can be candy or stationary things like scale, pencil, rubber according to the child for achieving dry nights.

Daily Dairy – VI. a

S. No	Intervention	Mon day	Tues day	Wednes day	Thurs day	Fri day	Satur day	Sun day
1	**Lifting/waking** 	4-7-11	5-7-11	6-7-11	7-7-11	8-7-11	9-7-11	10-7-11
		11-7-11	12-7-11	13-7-11	14-7-11	15-7-11	16-7-11	17-7-11
		18-7-11	19-7-11	20-7-11	21-7-11	22-7-11	23-7-11	24-7-11
2	**Waking with alarm** 	4-7-11	5-7-11	6-7-11	7-7-11	8-7-11	9-7-11	10-7-11
		11-7-11	12-7-11	13-7-11	14-7-11	15-7-11	16-7-11	17-7-11
		18-7-11	19-7-11	20-7-11	21-7-11	22-7-11	23-7-11	24-7-11
3	**Pelvic floor exercise** 	4-7-11	5-7-11	6-7-11	7-7-11	8-7-11	9-7-11	10-7-11
		11-7-11	12-7-11	13-7-11	14-7-11	15-7-11	16-7-11	17-7-11
		18-7-11	19-7-11	20-7-11	21-7-11	22-7-11	23-7-11	24-7-11
4	**Bowel movement regularly** 	4-7-11	5-7-11	6-7-11	7-7-11	8-7-11	9-7-11	10-7-11
		11-7-11	12-7-11	13-7-11	14-7-11	15-7-11	16-7-11	17-7-11
		18-7-11	19-7-11	20-7-11	21-7-11	22-7-11	23-7-11	24-7-11

5	**Voiding 5-6 times/day time** 	**4-7-11**	**5-7-11**	**6-7-11**	**7-7-11**	**8-7-11**	**9-7-11**	**10-7-11**
		11-7-11	**12-7-11**	**13-7-11**	**14-7-11**	**15-7-11**	**16-7-11**	**17-7-11**
		18-7-11	**19-7-11**	**20-7-11**	**21-7-11**	**22-7-11**	**23-7-11**	**24-7-11**
6	**Drinking water** 	**4-7-11**	**5-7-11**	**6-7-11**	**7-7-11**	**8-7-11**	**9-7-11**	**10-7-11**
		11-7-11	**12-7-11**	**13-7-11**	**14-7-11**	**15-7-11**	**16-7-11**	**17-7-11**
		18-7-11	**19-7-11**	**20-7-11**	**21-7-11**	**22-7-11**	**23-7-11**	**24-7-11**
7	**Fruits and vegetables** 	**4-7-11**	**5-7-11**	**6-7-11**	**7-7-11**	**8-7-11**	**9-7-11**	**10-7-11**
		11-7-11	**12-7-11**	**13-7-11**	**14-7-11**	**15-7-11**	**16-7-11**	**17-7-11**
		18-7-11	**19-7-11**	**20-7-11**	**21-7-11**	**22-7-11**	**23-7-11**	**24-7-11**
8	**Praising the child** 	**4-7-11**	**5-7-11**	**6-7-11**	**7-7-11**	**8-7-11**	**9-7-11**	**10-7-11**
		11-7-11	**12-7-11**	**13-7-11**	**14-7-11**	**15-7-11**	**16-7-11**	**17-7-11**
		18-7-11	**19-7-11**	**20-7-11**	**21-7-11**	**22-7-11**	**23-7-11**	**24-7-11**

APPENDIX . VI .b

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APPENDIX - VII

PHOTOGRAPHS

APPENDIX - VIII

MASTER SCORE SHEET

Sample no	Experimental group		Control group	
	Pre test	Post test	Pre test	Post test
1	7	2	7	6
2	7	1	3	4
3	6	0	4	3
4	6	2	7	8
5	3	2	6	5
6	5	1	7	6
7	3	1	7	7
8	4	0	8	7
9	7	0	7	8
10	4	1	6	5
11	6	1	7	8
12	5	0	6	7
13	6	0	5	6
14	8	1	6	7
15	8	2	4	6
16	6	2	4	5
17	5	2	3	3
18	7	1	5	5
19	6	1	5	5
20	6	1	3	3
21	5	1	3	3
22	11	3	5	6
23	8	2	6	7
24	5	3	4	4
25	5	3	6	6
26	6	1	5	5
27	6	1	6	6
28	6	1	6	6
29	4	2	6	6

Sample no	Experimental group		Control group	
	Pre test	Post test	Pre test	Post test
30	6	1	6	6
31	8	2	7	7
32	4	1	7	7
33	7	1	7	7
34	9	1	6	6
35	8	1	5	6
36	7	1	9	9
37	6	3	8	8
38	6	0	5	6
39	6	3	6	5
40	7	1	8	8
41	8	1	7	7
42	7	0	6	6
43	6	0	8	8
44	8	0	5	5
45	7	0	8	8
46	6	0	5	5
47	5	0	3	4
48	8	0	4	4
49	7	2	4	4
50	7	1	5	6